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ABSTRACT

The effect of modeling on the performance of rule-governed language behaviors of 208 male and female, Anglo and Chicano, sixth grade students in Albuquerque, N.M. was experimentally investigated. Eight boys and 8 girls (4 each Chicano and Anglo) were randomly assigned to each of the 12 experimental conditions and to the control group. Three modes of modeling were used: live, audio-taped, and written. Within each mode, the age and ethnicity of the model were manipulated. The results of the study indicated that sixth grade students, with neither reinforcement nor instructions to imitate, were able to abstract rules governing the use of modeled sentences and subsequently to use those rules to generate new sentences response to novel stimuli. Imitation phase stimulus pictures and modeled sentences are included. (PS)

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MODELING AND COGNITIVE BEHAVIOR: THE EFFECTS OF MODELING, MODES OF MODELING AND SELECTED MODEL ATTRIBUTES ON RULE-GOVERNED LANGUAGE BEHAVIORS

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MODELING AND COGNITIVE BEHAVIOR: THE EFFECTS OF MODELING, MODES OF MODELING AND SELECTED MODEL ATTRIBUTES ON RULE-GOVERNED LANGUAGE BEHAVIORS

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The effect of modeling on the performance of rule-governed language behaviors of 208 male and female, Anglo and Chicano, sixth grade students was experimentally investigated. These students, from four elementary schools, were randomly assigned either to a no-model control group or to one of forty-eight experimental modeling groups. Live, audio-taped and written models, who were (or were characterized as) either adults or peers and Anglos or Chicanos, modeled sentences in response to twelve pictorial stimuli. Each of the modeled sentences contained semantically related valuational-preference categories, a prepositional phrase and a relative clause. The six dependent measures were: Valuational Category, Other Value, Combination Values, Relative Clause, Prepositional Phrases and Length. No reinforcement to either the models or the subjects was provided and no instructions to imitate were given to the subjects. The subjects' performance of the specified behaviors was measured in imitation and generalization phases. Following exposure to the model, subjects were asked to compose and write sentences in response to the same twelve pictures. Immediately following this phase, the subjects were then asked to compose and write a sentence about each of twelve new and different pictures. By reference to the no-model control group, a clear modeling effect was revealed for each of the three valuational category measures, for the relative clause and the length measures in the imitation phase. In the generalization phase, a modeling effect was found for one valuational category, for the prepositional phrase measure and for the length measure. No effect was revealed for sex of subject nor for ethnicity of the model or subject. Age of model was significant in terms of the relative clause measure in which adult models had a greater effect than peer models. Mode of modeling had a significant effect on the valuational categories' scores in the imitation phase. Live and audio-taped models had significantly greater effects than written models. The results suggested that modeling alone could affect rule-governed language behaviors of middle-childhood students. Only slight evidence was available to support the contention that attentional variables such as mode of modeling and age and ethnicity of model affect the modeling phenomena and are important to social learning theory.

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CHAPTER 1

INTRODUCTION AND BACKGROUND OF PROBLEM

That learning occurs vicariously, at times when it is least desired, is indisputable. Children learn from adults, both directly and indirectly; children similarly learn from other children; and all individuals frequently learn from the tools and devices of their environment, e.g., television. While observing others, but in the absence of direct involvement or direct rewards, individuals may learn to imitate behaviors demonstrated by live or symbolic models. Through this imitation, one may learn to perform aggressive behavior, prosocial or anti-social behavior, vocabulary items, gestures, body positions and modes of dress. The sale of Wheaties likely owes much to the athletic heroes who model the mouthing of the wheat kernels.

The awareness, however, neither explains nor clarifies the phenomenon. Nor does this awareness reveal the degree to which imitative learning and modeling pervade our lives. Far beyond learning to purchase Wheaties and similar goodies, learning to wear certain clothes or learning the slouching shoulder posture of the 50's teenager, we also may learn aggressive behaviors, self-reward systems, moral judgments, altruistic behaviors, and phobias through imitation and modeling. It also appears that both modeling and imitation play important roles in the acquisition of rule-governed cognitive behaviors. In particular, conceptual behaviors and rule-governed language behaviors may be imparted by modeling. It has been demonstrated that the use of specified syntactical language features can be altered by modeling (Bandura and Harris, 1966), and that semantically related question asking behaviors can also be modified by modeling procedures (Rosenthal, Zimmerman and Durning, 1971).

Because of the prominence of the modeling phenomenon and the scope and magnitude of its influences, both modeling and imitative learning have been the subject of theories of learning. They have also been the subject of research and scientific investigation. It was the purpose of this study to continue these latter efforts in order to study aspects of the modeling phenomenon as they relate to rule-governed language behaviors.

In particular, this study attempted to answer the question of whether different types of modeling, i.e., live, audio taped, and written, could be used effectively in transmitting rules or principles related to syntactic and semantic aspects of language, rules then used to generate sentences similar to the modeled sentences as well as new sentences created in response to novel stimuli. Furthermore, this study attempted to answer questions related to the function of model attributes, in particular, the age and ethnicity of the model, on the observer's performance of the modeled sentences. That is, would these model attributes have effects upon the transmission and abstraction of the modeled rules and subsequent use of the rules?

The basic paradigm used in this study involved the observation of models while they responded to diverse pictorial stimuli in accordance with pre-selected rules related to the syntactic and semantic aspects of the modeled sentences. Both immediate and the subsequent generalized imitation were assessed and measured. The specific rule-governed behaviors were relative clauses and prepositional phrases (the syntactic aspects), and valuational-preference categories (the semantic aspect). Also measured was length of sentences.

The phenomena of modeling and imitative behavior have long been of interest to psychologists and learning theorists. Their descriptions and explanations have not, however, been without arguments. The disagreement has centered on the contentions that (1) imitative learning and/or modeling can account only for the learning of specific responses, i.e., mimicry of responses (Bandura, 1969; Rosenthal, Zimmerman and Durning, 1971), and that (2) direct reinforcement is a necessary condition for the occurrence of imitative learning (Miller and Dollard, 1941). The resultant conflict between theorists has stimulated researchers whose investigative efforts have led to the systemization and development of the inclusive and powerful social learning theory.

Social learning theory includes the belief that within a social context, learning occurs and behavior is influenced by observation of others. What one learns through observation of a model is not simply identical behavior; rather, one may learn a class of responses (occasionally including non-modeled responses) which can often be generalized to new situations. Furthermore, an individual may learn to perform or not perform some behavior or response. It seems clear that to attribute to vicarious learning or the modeling process only the acquisition or performance of mimicry responses is to limit its effects too much. This fact is strongly supported by the results of a number of investigations which demonstrate that a wide and diverse range of behavior can be imparted and influenced by modeling (Bandura, 1971a, 1971b; Flanders, 1968).

Modeling, as a means of influencing vicarious learning, may be better described than defined. Included as aspects of a minimal acceptable description are two persons, the model and the observer. The model performs a specified behavior even though he may not attend to the observer. The observer, for his part, does attend to the model and the modeled behavior. Modeling is therefore best visualized as a process rather than as an outcome. Nevertheless, an understanding of the modeling effects clarifies the phenomenon.

According to Bandura (1971a, 1971b), the modeling process implies three distinct effects. First, an organism can acquire new or novel patterns of behavior through the observation of a model (observational learning effect). Second, through observation of the model's behavior and the correlated consequences, the probability of the observer performing the behavior, through increasing or decreasing his inhibition to perform, can be increased (inhibitory or disinhibitory effects). Finally, modeling can facilitate the performance of low probability or rare-occurrence behaviors (response facilitation effect). Obviously, each of these effects implies a different manifestation of the modeling process and, furthermore, implies different controlling variables.

For Bandura, the modeling influences "operate principally through their informative functions," and it is through these that the observer acquires "symbolic representations" of the modeled phenomena. Imparting a strong cognitive flavor to this conceptualization, Bandura states that these representations are mediated by symbolic codes which, upon elicitation of the appropriate responses, guide their enactment.

Thus, and in opposition to the associationist theory, the observer acquires symbolic representations of the behavior rather than simple S-R associations.

Different variables are correlated with the modeling process and its effects. Four general sets of variables have been delimited which govern modeling: Attention variables; retention variables, motoric reproduction variables; and reinforcement and motivational variables.

In order for the modeling phenomena to exert influence upon an observer, that individual must attend to, recognize and differentiate features of the model and the modeled responses. The relevant variables include attributes, i.e., sex, age, ethnicity, etc., of both observer and model, the psychological state(s) of the observer, incentive conditions and features of the modeling cues themselves. Each of these variables is thought to exert some control upon the attention of the observer and thereby influence the modeling process and outcomes.

If the observer retains the totality or features of the original stimulus input in some representational forms, it can be anticipated that the observer can then reproduce the modeled behavior at a later time. In order to reproduce the behavior, the individual must retain its representation. Retention is thought primarily to be facilitated by the observer's ability to rehearse and the actual rehearsals, either overt or covert, of the modeled behaviors.

If the observer is to perform the modeled behavior, his performance may be influenced by motor reproduction variables. These variables are crucial since they may limit an observer's performance.

Relatively little interest has been shown by investigators in this set of variables, as evidenced in the scarity of relevant research. These variables would be of central importance if the modeled behaviors were walking, marching, turning, gesturing or other gross motor behaviors. If the observer is incapable of performing some of these behaviors, because of motoric behavior deficits, then the motor reproduction variables become important.

In Bandura's theory, reinforcement and motivational variables are the fourth set of factors which influence the modeling process. Within the social learning paradigm, reinforcement is assigned a facilitory role as opposed to a necessary one. While social learning can and does occur without reinforcement, reinforcement does affect the attention and retention processes. This view is at odds with the reinforcement or operant conditioning paradigm which contends that reinforcement is a necessary condition for learning to occur. In addition, while reinforcement theories focus on the direct reinforcement or punishment of the organism and their role in learning, social learning theory also focuses on vicarious reinforcement and attributes to it a central role in the learning and the performance of modeled responses. In general, the reinforcement variables both regulate the overt performance of the modeled behavior and affect observational learning "by exerting selective control over the modeling cues attended to."

In short, while motivational and reinforcement variables are of importance to Bandura's theory, the perceptual and cognitive aspects of vicarious learning occupy the central positions in his social learning theory.

As this theoretical paradigm has been extended into the domain of rule-governed cognitive behaviors, several features of the extant research are obvious. (Some of these are more evident than others.) As will be seen in the following chapter, the investigations of rule-governed cognitive behaviors involve the study of observational learning and response facilitation effects rather than inhibitory/disinhibitory effects. Less evident is the fact that investigators have primarily focused on attentional and reinforcement variables rather than the other variables. As suggested earlier, the motor reproduction variables invoke little interest. On the other hand, variables which relate to the discriminability of the modeling cues have been of major concern; of prime interest have been the roles of instruction and reinforcement. Of much less interest to investigators, but nevertheless related to attentional variables, have been model attributes or characteristics and modes of modeling.

Those studies which have focused on the role of model attributes have not been concerned with rule-governed cognitive behaviors; rather, when the attributes of a model have been of experimental interest, the behavioral task has been related to social behaviors, e.g., aggressive behavior, self-reward systems, etc. The interest in modes of modeling has been cursory. While the majority of studies of modeling have used either live, filmed, or video taped models, these methods of presentation have not been the independent variables under investigation.

With reference to rule-governed language behaviors, various studies have demonstrated the effects of modeling. While these studies are discussed in detail in the next chapter, it can be noted that social learning variables have been shown to be influential in the modification of prepositional and passive constructions, sentence length and complexity, tense construction and question asking behavior. Although these studies (as well as the present study) were concerned with rule-governed language behaviors, not one of them demonstrated (nor claimed to demonstrate) the acquisition of language rules or the role of modeling in language acquisition. All, however, did touch upon the role of modeling on the performance of the rule-governed language behaviors. This distinction is crucial since it relates to the equally important distinction between linguistic competence and linguistic performance (Chomsky, 1965).

Linguistic competence centers on the knowledge an individual has about his language system and the abstract linguistic rules involved in that system. It is, therefore, related to the speaker's ability to, among other things, create and recognize new and novel sentences. Linguistic performance, on the other hand, is related to the speaker's overt language out-put; it is the expression of that speaker's linguistic competence. It was linguistic performance, rather than linguistic competence, that was the domain of this study.

This study was concerned with the way certain abstract language rules were used and not with the acquisition of those rules. It had to be assumed that the rules governing the specified linguistic structures where already known by the students, that the students could use them to produce the linguistic structures, but that the use of those rules to generate sentences was unlikely in the context of this study.

Moreover, from a socio-linguistic perspective, this study also related to the communicative or social competence of the students

(Hymes, 1966; Cooper, 1970). This type of competence, much like linguistic competence, implies rules, but social rules which the language user must acquire and use. These rules, for the most part unspecified, theoretically govern what is said, the time and place in which utterances are made, to whom an utterance is directed, etc. Although the social rules were not of primary concern in this study, it was assumed that a rule (or rules) was inherent to the modeling situation, was acquired by the students and ultimately used.

While the relationship of social learning variables to syntactically and semantically related language behaviors has been investigated, the significance of modes of modeling and model attributes has not been sufficiently analyzed. Furthermore, truly little research has been concerned with the relationship of modeling to semantic or interpretive behaviors. Only studies by Rosenthal, Zimmerman and Durning (1970), Rosenthal and Zimmerman (1972b), Zimmerman and Dialessi (1973), Rosenthal and Hertz (in press), and Harris and Evans (in press and manuscript) have touched on this relationship.

It appears that the activities of interpretation or categorization are learned to some extent and that both are rule-governed. As a consequence, it appears that both activities, as aspects of semantic phenomena, are subject to modification, including modification by modeling.

It seems logical to assume that variables such as model attributes and mode of model presentation do affect the discriminability of modeling cues and the observational learning of the modeled task. More specifically it would appear that these variables would affect the acquisition and utilization of model displayed rule-governed cognitive behavior. It is the purpose of this study to investigate and to answer questions related to this aspect of social learning theory and rule-governed language behaviors.

While this study is meaningful for its contributions to social learning theory, it bears significance for other reasons.

First is the incorporation of small groups as the unit of experimentation. This feature is of importance theoretically and practically. In a theoretical sense, little research has been designed to investigate modeling effects in the context of small groups. On a practical level, the use of small groups more closely approximates the learning or teaching units found in the school setting. Thus, the modeling procedures used resemble activities and procedures used in real situations and, as a result, add to the validity and to the applicability of this study.

The study is of particular applied value since the usefulness of various forms of modeling is demonstrated in relation to school related language tasks. Most modern curriculum guides incorporate both syntactically and semantically related objectives in the language arts, e.g., using and writing complex sentences, writing and using sentences with clauses, learning the meanings of words from context, interpreting prose and poetry. Such concern highlights the need for methods of teaching such behaviors. It is felt that the modeling procedure and the use of live, taped, and written models will contribute to fulfilling this need.

The independent variables incorporated in this study included the mode of model presentation, i.e., live, audio-taped, and written; model age, i.e., adult and peer; and model ethnicity, Chicano and Anglo. To assess the effects of modeling and the model attributes, male and female, Chicano and Anglo sixth grade students were exposed to the models.

For each of the dependent measures of relative clauses, prepositional phrases, valuational-preference categories and length, a series of hypotheses was generated and statistically tested. The hypotheses were:

1. The scores of the subjects exposed to modeling would be significantly ($P<.05$) greater than the control subjects' scores. That is, there would be a main effect for modeling.

2. The order of the main effect mode of modeling was predicted as follows (from highest to lowest): Live, audio-taped, and written. The live and audio-taped model subject scores would both be significantly greater ($P<.05$) than written model scores.

3. There would be no main effect for either sex or ethnicity of the subjects. No interaction of sex and ethnicity of subject was predicted.

4. No main effect for ethnicity of model was predicted. However, an interaction of subject ethnicity and model ethnicity was predicted such that "like-ethnicity" scores, i.e., Chicano Subject-Chicano Model Scores would be higher than Chicano Subject-Anglo Model Scores, etc.

5. A main effect for age of model was predicted such that the peer model subject scores would be significantly higher ($P<.05$) than adult model subject scores.

No other effects or interactions were predicted.

Regardless of the theoretical and applied contributions made by this study, it is at best only a partial attempt to meet the need for newer and better methods of teaching and presenting higher order and rule-governed cognitive behaviors in a school setting. In addition, this study only answers several questions of the many generated by a study of the social learning theory.

CHAPTER 2

REVIEW OF THE LITERATURE

The development of social learning theory has been paralleled by the correlated appearance of research studies. The research efforts, like the theoretical formulations, have been led by Bandura whose efforts extend from the investigation of the role of reinforcement on observational learning of aggressive behavior in young children to the uses of modeling in overcoming fear of snakes. However, Bandura himself has been relatively inactive in the investigation of the modeling of rule-governed cognitive behaviors. Nevertheless, other investigators have contributed a significant amount of knowledge and information about the relationship between modeling, the relevant variables and the acquisition of rule-governed cognitive behaviors.

Obviously, these studies and results are of importance and relevance to the study at hand. Of added importance are those research findings dealing with the effects of attentional variables, in particular, model attributes such as age and ethnicity. Each of these categories of studies will be reviewed and their relationship to the present study demonstrated.

As interest in the relationship between rule-governed cognitive behaviors and observational learning matured, the experimental studies led in two separate, yet related, directions. On the one hand, the relationship with the formation, transmission, and generalization of concepts was probed. On the other hand, researchers devoted their efforts to the examination of rule-governed language behaviors. While the latter studies are more germane to this study, the former studies merit some brief mention, if for no other reason than the clarification they supply to modeling and of rule-governed behavior. Therefore, a few of these studies are noted.

Non-language Concept Learning Studies

A study by Rosenthal and Zimmerman (1972a) involved a series of four experiments to determine whether conservation could be induced in young Anglo and Mexican-American children through observational learning. Using modeling alone or in conjunction with reinforcement and/or rule provision, the results supported the interpretation that the subjects induced the relevant abstract relationships inherent in the conservation tasks. They concluded that modeling techniques were effective in transmitting the abstract concepts and that verbal praise or vicarious reinforcement had little influence on the dependent variable scores.

Rosenthal, Moore, Dorfman and Nelson (1971) designed a study to demonstrate the acquisition of an arbitrary equivalence rule by modeling procedures. Three separate groups of young subjects (Median ages: 3.5; 5.0; 6.0 years) were assigned to a control group, a modeling plus verbal cues group and a modeling alone group in a 3 (phases) x 3 (conditions) design. While there was no significant treatment difference in the imitative acquisition of the rule, the modeling plus verbal cues subjects, particularly the oldest subjects, tended to surpass the modeling alone subjects. The no-model-control subjects in all age groups showed virtually no score changes. Because the rule was arbitrary and presumably not dependent on or influenced by the subjects' prior learning or experience, this study assumes a degree of importance. It quite clearly demonstrated that modeling alone is sufficient to effect concept acquisition. However, the significance of the verbal cues is not as clearly identifiable.

Investigations by Rosenthal, Alford and Rasp (1972) and Zimmerman and Rosenthal (1972) demonstrated the observational acquisition and the subsequent generalization of complex, yet arbitrary, concepts. The former study demonstrated that an arbitrary clustering task could be observationally acquired by second grade students who observed a model display the behavior. Furthermore, it was demonstrated that the abstract rule could then be generalized to novel stimuli by the Ss. All of the four modeling groups, i.e., silent modeling, low information modeling group, high information modeling group, and high information plus rule modeling group, surpassed the control, no-model group at both imitation and generalization. It was also revealed that the scores of the high information plus rule group exceeded the scores of the other modeling groups.

The Zimmerman and Rosenthal study attempted to extend the results of the previous study by determining whether observationally acquired responses are stable over time. Four conditions were instituted: A no-model, no rule control condition; a no-model, with rule condition; a model + rule condition; and a model, no rule condition. Scores for Ss acquiring the arbitrary concept indicated that there were significant main effects for modeling and for rule provision; similar results were found for delayed generalization. It was concluded that the results demonstrated that by modeling procedures alone a concept could be acquired observationally, retained, and then generalized to a novel stimulus after a significant lapse of time (2 weeks).

These brief remarks make it evident that the observational learning effect is not restricted solely to social behaviors. At the same time, they point out that rule-governed cognitive behavior is amenable to modification by modeling procedures. As mentioned, a second area of interest has been the role of modeling in the area of language behaviors.

Syntactic Behavior Studies

One of the earliest attempts to investigate the roles of social learning variables on rule-governed language behavior was made by Bandura and Harris (1966) in which the alteration of syntactic style as exemplified by prepositional phrases and passive constructions, was influenced by verbal modeling, reinforcement, and attentional cues.

Second grade subjects were randomly assigned to either a control group or experimental groups. It was found that the subjects' syntactic style could be altered by social learning procedures. In particular, the passives, which displayed a very low base rate production, were significantly altered by the combination of modeling plus reinforcement plus attentional cues. No other combination of social learning variables was effective in increasing the use of passives. The production of prepositional phrases, which were more common in the base rate period, was significantly increased in both the reinforcement plus attentional set and the modeling plus reinforcement plus attentional set conditions. However, it was concluded that the modeling cues were not a significant contributory factor in their increased production. Nevertheless, it was thought that even with a common response like prepositional phrases, modeling enacted a facilitory role. Since this study included a counter-balancing of modeled constructions, i.e., prepositional phrases followed by the passives and vice-versa, it was possible to analyze the modeling effect on the continued production of prepositional phrases when no longer appropriate. In the reinforcement plus attentional set condition, subjects continued to produce the phrases when inappropriate. However, subjects in the modeling plus reinforcement plus attentional set condition did not show a similar effect. The phenomenon suggested that modeling plays a "discriminative function signifying the change in reinforcement contingencies". Although the content of the sentences generated was not rigidly analyzed, evidence was found that demonstrated only rare mimicry of the model's passive constructions. In fact, the authors state that some subjects generated a number of novel sentences which they deduced to be evidence supporting the contention that principles exemplified in a model's behavior can be acquired observationally and thence used "for generating novel combinations of responses".

The importance of this study is in the fact that it was one of the first attempts to demonstrate that social learning variables had an effect on syntactic constructions and on rule-governed behavior.

A study by Odum, Liebert and Hill (1968) was a slightly modified replication of the previous study and provided additional information on second grade subjects' language performance. Although this study was not a direct test of the variables affecting language acquisition, it was a test of whether or not principles for generating novel sentences could be acquired observationally. Subjects were both exposed to and rewarded for the production of sentences containing either the syntactic construction Preposition + Article + Noun (English Rule condition) or the construction Article + Noun + Preposition (New Rule condition). A control group experienced neither the active model nor reward. The results demonstrate that both experimental groups increased the production of English Rule constructions.

A second experiment was designed to test two alternative explanations for the increased production in the New Rule Condition. The result could either be explained by the subjects' misperception of the modeled New Rule construction or, alternatively, the phenomenon could have been the result of active, cognitive processes on the part of the subjects. Utilizing the same experimental condition, subjects were asked to repeat verbatim the relevant sentences of the model upon being rewarded. While reasoning that successful repetition of the New Rule construction would offer support for the "active process, problem solving" alternative, the results indicated that both experimental groups increased the spontaneous construction of English Rule items. That is, the repetition manipulation did not facilitate spontaneous productions over those made by either group in the first experiment. Among the conclusions drawn were that, in the case of the syntactic constructions already present in the subjects' linguistic inventory, social learning variables do affect their production. This fact reaffirmed the strength of modeling effects on the linguistic performance of the students. Secondly, the results supported the "active process, problem solving" alternative. The increased production of the English Rule items in the New Rule condition was therefore not due to misperception but due to an active process within the subjects. Finally, it was concluded that certain (but unspecified) cognitive factors were operative in this process.

In order to determine the extent of the active process hypothesis as exemplified in the re-ordered unfamiliar New Rule language constructions, Liebert, Odum, Hill and Huff (1971) tested two alternative explanations for the re-ordering. If the re-ordering of the unfamiliar constructions is a result of the child's prior language experience, then one would expect that "successful repetition and spontaneous production of sentences which deviate from familiar language rules" should decrease with increasing age. On the other hand, if the re-ordering represents an inability to abstract the new rule in a brief training period, then "successful repetition and production of the new construction might be thought to represent a strategy" which is fostered by the development of abstraction processes. Thus, assuming that cognitive changes involve the increased functioning of abstraction processes, the repetition and production of unfamiliar constructions would be expected to increase with increasing age. In order to compare these two alternatives, subjects from three age groups (Mean C.A.'s: 5.8; 8.4; 14.1 years) were assigned to both the English Rule and the New Rule conditions. Using both base rate and training periods, the latter in conjunction with an adult model, and vicarious and direct reinforcement, the results supported the general hypothesis that the adoption of language rules is influenced by a combination of modeling and reward procedures. In the English Rule condition, the oldest subjects' performance surpassed that of either of the two younger groups. This result partially confirmed the hypothesis that the ability to abstract and later use a model-exemplified language rule is directly related to the subject's age. In the New Rule condition, which was a test of the acquisition of a novel language rule, the youngest subjects encountered the greatest difficulty in repeating the unfamiliar constructions; indeed, they tended to re-order the constructions according to the English Rule. The older subjects, however, tended to decrease the number of English Rule constructions and, consequently, increased the number of New Rule constructions produced.

The results of the previous three studies support the contention that language performance can be modified by social learning variables, i.e., modeling and reinforcement. In one case, it was shown that these variables are important in the acquisition of a novel linguistic rule. Thus, these studies illuminate some of the powerful observationally induced effects on childrens' production of abstract rule-governed language responses. Evidence is also provided for the importance of the cognitive features of acquiring of performing the specified language responses.

A study by Rosenthal and Whitebook (1970) served to extend the understanding of social learning variables' effects on abstract behavior. In a modified replication of an unpublished study by Carroll, Rosenthal and Brysh (in press), the effects of modeling, incentives and instructions on sentence pattern, word content, and tense by third and fourth grade subjects were measured. Using a modeling plus incentive condition, a modeling plus instructions condition and a control group, subjects were exposed to the modeled construction Noun + Imperfect Transitive Verb + Noun Object. Analyses of the data, done by combining across grade and sex, revealed that the response parameters were largely independent. In the imitation phase, both experimental groups significantly increased their imitative language performance. Only for the word content measure was there a significant difference between the experimental groups; the instructions group displayed greater imitation than the incentive group. The generalization data revealed an effect for modeling for both sentence structure and tense measures; however, there were no effects for instructions and incentives. It was concluded, as in the Carroll, Rosenthal and Brysh study, that in accord with the rule governing the model's utterances, the subjects were able to modify their own rule-governed language responses and to generalize the paradigms to new stimuli. In particular, through observational learning, a kernel-sentence pattern was transmitted and the influence of modeling on word content and tense choice was shown. Finally it was concluded that, due to the results that the instruction condition equaled the incentive condition responses, under certain conditions instructions may be as effective as incentives in this vicarious learning situation.

Rosenthal and Carroll (1972) explored the effects of modeling, instructions (strong versus weak) and incentives on the adoption of complex sentences and the past perfect tense, both relatively complex grammatical constructions, by economically deprived seventh grade children. In contrast to the previous studies in which the subjects were treated individually, small groups were the experimental units. Following the base rate period, groups were exposed to either strong or weak instructions, both before and after modeling, incentives both before and after modeling, or no incentives. Analyses of the data for the two dependent measures showed significant differences favoring the experimental groups over the control. It was concluded that the model's demonstration "created substantial increases over the scores of no-model control subjects". For both measures the only other significant effects found were for instructions, with strong surpassing weak, and for sex, with boys surpassing girls. The result that incentives had little effect upon the adoption of the grammatical structures was important. This finding is reminiscent of Rosenthal and Whitebook's that instructions were as effective as incentives in learning school-like tasks. Although no attempt was made to discover the effects of these variables on the generalization to new stimuli, the results do support the ideas that (1) economically disadvantaged subjects can learn to use rather complex grammatical constructions via observational learning procedures and (2) this learning can be effective in group situations. Although no mention is made of this latter point, it does appear to be important, especially in light of the need for effective yet economical teaching-learning methods.

A study by Harris and Hassemer (1972) investigated the effects of modeling alone on children's production of longer and more complex sentences. Rather than manipulating instructions or reward, the length and complexity of modeled sentences were manipulated. Another purpose of this study was to determine whether the "difference in length, complexity and modeling effects would be found for English speaking children hearing English sentences modeled, children bilingual in Spanish and English hearing English sentences modeled, and bilingual children hearing Spanish sentences modeled." The subjects, 96 second and fourth graders, were treated individually and the dependent variables were scored for a base rate period, a simple sentences modeled phase and a complex sentence modeled phase. The order of modeled sentence production varied between simple first and complex second and vice-versa. Data for both length and complexity were essentially identical. A significant grade level effect, with fourth graders constructing longer and more complex sentences, was found. A significant modeling effect, occurring without either instructions to imitate or reinforcement, was found. This effect was characterized by the fact that subjects would construct longer and more complex sentences when they heard a model uttering complex sentences than when they heard a model speaking simple sentences or when they heard no model at all. Due to a significant phase by order interaction, it was suggested that the "effects of the model's first sentence persist even when the modeled sentences become more or less complex". Equally important was the fact that no sex or language differences or interactions were found.

Other Linguistic Behavior Studies

While the above studies have focused on the relationship between social learning variables and rule-governed syntactic behaviors, other studies have focused on other rule-governed language behaviors.

In a clever study by Rosenthal, Zimmerman and Durning (1971), the influence of modeling upon "children's formulation of questions regarding a set of stimulus pictures" was studied. Combining modeling procedures with either explicit instructions, i.e., "learn the model's question", or implicit instructions, i.e., "watch and listen", the sixth grade subjects observed a number of examples of questions which represented one of four abstract classes. The classes of questions studied represented: (1) physical attributes of the stimuli; (2) their pragmatic function; (3) causal relationships involving the stimuli; and, (4) judgments of value or preference concerning the stimuli. As the authors state, "The four questionclassifications presently studied were intended to exemplify widely divergent rule-governed dimensions for the conceptual organization of a set of stimuli." After the baseline phase, the four experimental groups were exposed to an imitation phase in which one-half of the subjects of each group received either explicit or implicit instructions in addition to the exposure to twelve instances of the particular modeled queries. Subsequent to the readministration of the original stimuli, a new series of stimulus pictures was introduced to measure the degree of generalization. Control (or no model) groups were included to provide a basis for comparison. Analyses of the data revealed that for each of the question category groups, and across phases, exposure to modeling significantly increased the subjects' production of each modeled response class. Not only were the children able to categorize the relevant stimuli in accord with each of the modeled criteria, but they generalized the criteria to new stimuli. The role played by instructions was minimal; only in the physical attributes question category did explicit instructions to imitate exceed the implicit ones. The data dealing with mimicry or exact imitation offer significant insights into the nature of modeling effects. An analysis of the frequency of exact imitation for all experimental subjects demonstrated that less than 12% of the total responses were exact imitations and these responses were made by less than 30% of the subjects. Additionally, almost 75% of the mimicry responses were made by subjects explicitly instructed to imitate. These results are significant for two reasons; first, they demonstrate that the belief that the modeling effect implies exact imitation or mimicry is a misconception; and second, they provide evidence that the mimicry that does occur may be due to instructions rather than to the modeling phenomenon itself.

In a study fashioned to extend the findings of the above study, Rosenthal and Zimmerman (1972b) investigated the effects of modeling, expectations, and instructions on the choice of a value or preference question category. Using two sets of stimulus cards, a correct response was any question related to the valuation category. All groups of the third grade subjects were able to acquire the valuation question strategy and to generalize the rule-governed feature to new stimuli. Contrary to expectation, neither favorable nor neutral expectations had any strong effect; there was a strong modeling effect. In the imitation phase, the four instruction groups, implicit (i.e., _S_s were instructed to watch carefully), explicit (i.e., _S_s were instructed to watch and learn _M_'s questions), pattern (i.e., _S_s were instructed to attend to the specific way in which _M_ formed his questions), and mapping (i.e., _S_s were provided with examples of how the _M_ was about to form his questions) instruction groups significantly differed. The implicit instructions group scored significantly lower than the other groups, and the mapping group surpassed the pattern group. The four groups did not differ in the generalization phase.

In a similar study Zimmerman and Pike (1972) investigated the effects of modeling and reinforcement on the acquisition and generalization of question-asking behavior of disadvantaged second grade children. Rather than replicating the previous studies, the authors probed whether question asking skills _per se_ could be taught by a combination of modeling and praise, by praise alone or by control procedures. As a consequence, the design incorporated multiple phases, i.e., baseline 1; training

1; baseline 2; training 2; post-testing, in which small groups served as the units of study. The results showed that modeling in conjunction with reinforcement produced the acquisition and generalization of the skills. In addition, a separate post-test measure of generalization indicated that the modeling-praise groups significantly surpassed the praise alone and control groups. While praise alone did increase the question-asking behaviors, it was concluded that, due to the unsystematic fluctuations in responding displayed by these groups, praise alone possibly is not a sufficient reinforcer to "maintain optimal responding for poor Mexican-American second graders".

The contention that observational learning is a means by which rule-governed behavior can be transmitted is also supported by the results of a study by Rosenthal and Hertz (in press). They used audio taped models with college students in which observational learning of inkblot percept categories, representative of the Klopfer system of categorized percepts was investigated. The Klopfer system categories included trite responses related to the detail, locations and shape determinants of the inkblot pictures, creative responses of good form-quality using whole locations and human movement determinants of the pictures and "sick" responses of "poor form-quality using tiny detail locations and equal numbers of animal movement and inanimate movement determinants". The subjects listened to a tape purportedly made by either an expert or a peer (i.e., non-expert) while observing the stimulus pictures. While no baseline differences were found between the control and experimental subjects, it was found that imitative percept formation for all but one response category occurred with exposure to the modeling tapes. The subjects not only induced the abstract criterion inherent to each category but transferred this same criterion to new inkblot pictures. Both imitation and generalization occurred without instructions to do so. The scores of _Ss_ exposed to the effects of an expert versus peer model resulted in almost no differences.

Recent studies by Zimmerman and Dialessi (in press) and Harris and Evans (in press and manuscript) have also explored the relationship between modeling and rule-governed cognitive behaviors. Specifically, these three studies investigated the effects of modeling upon creative behavior.

Zimmerman and Dialessi studies a video-taped model's effects upon the creative behavior of fifth grade students. The models displayed creative behavior either high or low in fluency (it refers to the number of ideas produced on a creative task) or flexibility (it refers to or describes the number of qualitatively different categories needed to group responses) creativity dimensions. The results revealed that the subjects' fluent and flexible creative responses were increased by exposure to a fluent creative model and decreased by exposure to a flexible creative model. The modeling effect was found to occur for both parallel and novel tasks. In general, this study indicated that children's creative behavior (a rule-governed cognitive behavior) could be modified by vicarious modeling influences.

A study by Harris and Evans (in press) explored the effect of symbolic written models upon the creative behavior of college students. Groups of subjects were exposed to either a prolific divergent thinking model, a prolific convergent thinking model or an inadequate convergent thinking model, all of whom displayed creative behavior on an unusual uses task. A fourth group of students served as the no-model control group. The modeling effect was measured for identical, similar and generalization tasks. The significant result was that subjects exposed to either one of the convergent models produced more convergent and fewer divergent responses than those subjects who observed the divergent model. It was concluded that students' novel, i.e., creative behavior could quite easily be increased solely by exposure to a written model.

A second study by Harris and Evans (manuscript) explored the effect of modeling on creative behavior as well as the effect of instructions on the performance of that behavior. A symbolic written model was used; groups of college students were exposed to either a divergent thinking model, a convergent thinking model, to no model or to instructions to respond creatively. Each group was then tested for its creative behavior on four creativity tasks. It was found that as a result of exposure to either a divergent or convergent model, the subjects produced similar responses on the similar and identical creativity tasks. In addition, the modeling effect was found to be a stronger contributor to the modification of creative behavior than were instructions.

These studies, as well as the study by Rosenthal and Hertz, demonstrated that rule-governed cognitive behaviors other than the conceptual and language behaviors previously mentioned can be altered by modeling procedures. In addition to all of the above, other investigations have looked at the relationship of modeling procedures and rule-governed behaviors. These include Zimmerman and Lanoro's (1972) study in which economically disadvantaged children were trained with modeling procedures in the conservation of equal and unequal items. It was found that modeling was not only an effective procedure for the imitative tasks but that the students could transfer their newly acquired skill to a new task and to a task measured ten days later.

Kessler, White, Rosenthal and Phibbs (manuscript) compared the effectiveness of modeling procedures with three information plus practice methods in training fifth grade students to perform a complex task similar to organizing a bridge hand. Underlying the task was a rule governing the organization of the card hand. Concept attainment was measured immediately and ten days later. In all cases the modeling procedure surpassed all three information plus practice methods in bringing about attainment of the concept.

Zimmerman and Bell (1972) investigated the effects of an observer's verbalizations on the vicarious learning of an abstract of an associative rule. They found that the fifth grade subjects who verbalized about the model's behavior displayed less acquisition of either rule than did subjects who passively observed the model.

Other investigators have explored the difference in the modeling effect when the roles of the model and experimenter were merged. Rosenthal and Whitebook (1969) used a female as both model and experimenter. The results were similar to those obtained by Carroll, Rosenthal and Brysh (in press) who used a male as both M and E. Rosenthal, Feist and Durning (1972), who compared an experimenter as model design with a separate M design, found no differences between the two approaches.

While the relationship of modeling to rule-governed cognitive behaviors has been systematically probed, the role of model attributes such as age and ethnicity have been much less systematically investigated. Not only have these variables not been studied in relation to the acquisition and/or performance of cognitive language behaviors and other rule-governed cognitive behaviors, but the results of the available studies on social and other behaviors have been less than definitive.

Effects of Age of Model Studies

In a study by Bandura and Kupers (1964), the imitation of self-reward patterns and verbal behavior modeled by adult or peer (9 years old) models was investigated. The male and female subjects, who ranged in age from 7 to 9 years, were exposed to either an adult or peer model who adopted either a high or low criterion self-reinforcement while performing a bowling task. A no-model control group was also included. The results demonstrated that there were no sex of model or sex of subject influences on the self-reinforcing responses of the subjects. The scores for self-reward revealed that the children matched the self-reinforcement patterns of the adult models more precisely than those of the peer models. However, in the low criterion condition, the Ss displayed more imitation of the peer models than of the adult models. The overall results showed that children in the experimental conditions rewarded themselves for performances that matched the self-reinforcement pattern displayed by the models; the control subjects, however, rewarded themselves independent of their task performance level. The subjects also adopted the verbal behavior of their models, i.e., the self-administered verbal reinforcements. Although the subjects did tend to watch the self-reward patterns modeled by the adults more than those patterns modeled by their peers, these differences were not statistically significant.

Bandura, Grusec and Menlove (1967) also investigated the role of modeling in the transmission of self-reward systems. Boys and girls, ranging in age from 7 to 11 years, were exposed to self-reinforcement patterns and standard setting behavior modeled by adults and peers. Half of the children in high and low nurturance conditions were simultaneously exposed to a peer and an adult model, who modeled conflicting self-reward standards which led to the presentation of conflicting modeling cues. Peer models always exhibited low standards. Analyses revealed a significant main effect for the behavior modeled by the peer. As predicted, children who were exposed to conflicting modeling cues were inclined to reward themselves for low achievement, while subjects who viewed only the adult models adhering to the high standard of self-reward tended to reward themselves only for high levels of achievement on the bowling task. The relevant finding dealt with the effect of the conflicting peer modeling cues; S̲s̲ who experienced this conflict tended to increase the incidence of their self-rewarding responses. This exposure, however, did not increase the frequency of self-reward responses for performances that did not reach the minimum standard adopted by the peer model. In terms of the magnitude of the self-reward, children who observed a peer, rewarded themselves more generously than children who observed the adult model. This tendency, however, was effectively neutralized when the competing adult model received positive reinforcement for his adoption of a high standard of self-reinforcement.

A study by Nicholas, McCarter and Heckel (1971) revealed that a televised white adult model was imitated while a televised white peer model was not. Subjects were second grade white and Negro boys and girls who were exposed to the televised models, both male and female, adult and peer. In addition to the significant difference between imitation of the adult and peer models, boys imitated the male model more frequently than did the girls and the girls imitated the woman more than did the boys. The only significant race difference revealed that Negro subjects imitated the woman less frequently than did the white subjects.

Malcolm (1970) investigated the effect of adult and peer models on the moral judgments of fourth grade boys. The subjects, pre-tested and subsequently classified as making either objective or subjective moral evaluations, were assigned to experimental groups viewing an adult model, peer model, or no model. The results revealed that both the adult and peer model were more effective in inducing significant changes in moral judgments for the objective moral evaluation subjects than the no model control condition. However, neither the adult nor the peer model was effective in inducing changes in the moral judgments of "subjective" subjects.

Hamm and Hoving (1971), who explored the effectiveness of adult and peer models in influencing judgments of young children, found that with increasing age children learn to depend upon their peers rather than adults for information and social support. In a first experiment, groups of subjects from grades 2, 5, 8 and 11 were exposed to symbolic adult and peer models (names of the models were written) who offered judgments on the specified task. A second experiment used real models (but not in the presence of the subjects) who offered judgments to groups of second, fifth and eighth grade subjects. Conformity was measured by counting the frequency of subject agreement with the model's judgment. The results revealed that peer M conformity was an increasing function of the subject's grade level. The fifth grade Ss exhibited the greatest level of conformity to peer models.

Race of Model Studies

A small number of experimental studies have also attempted to define the influences of the race of model attributes of race on imitative learning and behavior. At best, the combined results are equivocal.

Breyer and May (1970), designed a study to investigate the effects of both sex and race (white and Negro) on the imitation of verbal behavior and motor behavior in white and Negro subjects ranging in age from 60 to 72 months. Ss were exposed to a M who was either a Negro male, Negro female, a white male, or white female. The results for verbal imitation, motoric behavior imitation and total imitation (the sum of the previous two) were equivocal. A large number of Ss did not respond verbally; for the motoric responses, a significant race of subject effect (Negro Ss imitated more than white Ss), and a significant interaction of race of subject by model team effect were found. The total imitation data, which were heavily weighted with motor behavior responses, showed a significant race of S effect in which Negro Ss imitated more than white Ss.

A study by Liebert, Sobol and Copeman (1972), was designed to determine the effects of vicarious consequences and the race of model (white or black) upon the Ss imitation and recall of the black and white model's commodity preferences. The consequences included: vicarious reward, vicarious punishment, and no vicarious consequences. Acceptance and recall responses were also contrasted. In the acceptance condition, subjects were told only to point at the item that he preferred; the recall condition involved the subject being told to point to the item the model had selected. The results demonstrated a significant effect for vicarious consequences (vicariously rewarded subjects more readily accepted or recalled the model's choice than those subjects without consequences) and a significant main effect for the race of the model. The black subjects tended to accept and recall the behavior of the White adult model more than that of the Black adult model.

A study by Rosenbaum (1971), examined the effects of the races of the subjects (black and white, 2nd and 3rd graders), examiners (black and white), and models (black and white) on the imitation of a button-sorting task. Greater imitation was shown by the young white subjects than by the black subjects although the black subjects appeared to be more sensitive to the race of the examiner than of the model.

A study by Thelen and Frybear (1971), measured self-reward behavior and responses of black and white male adolescents (15-17 years) who had observed either black or white televised models who displayed either a liberal or a stringent self-reward standard. The results showed no significant effect due to the race of the subjects and no interactions. For the liberal model condition, a significant main effect for model race was found; the subjects of both races tended to imitate the white liberal model more than the black liberal model. Similar results were not found for the stringent self-reward models.

Thelen (1971), studied the effects of subject and model race (black and white) and praise (reinforcement) on the imitation by kindergarten and first grade children of aggressive behavior. Using audio-video taped models, the imitation and verbal recall of the modeled behavior were measured. While no significant main effects were found for the imitative data, a significant subject race by model race interaction was revealed with the white subject - black model scores higher than those of Ss in the white subject - white model group. Also noted was a trend in the direction of greater imitation of white models by black subjects than by white subjects. For the verbal recall scores, only the interaction between subject race and praise - no praise was significant; Negro Ss who observed a M who was not praised recalled more of the model's motor behavior than Negro Ss who observed a praised M and more than white Ss who observed a M who was not praised.

These results, when compared with the other studies, merely highlight the equivocalness of studies dealing with modeling and race of M and S. In the Thelen and Frybear study and the Rosenbaum study white Ss imitated the white Ms more than other Ms; in the Thelen study, the black Ms were imitated more than the white Ms by the white Ss; and in the Breyer and May study there was no difference between white Ss imitative scores of white and black Ms. For black Ss it was found by Thelen and Frybear and Liebert, Sobol and Copeman that white Ms were imitated more than black Ms; Rosenbaum found black Ss were more sensitive to the black examiners than to the black or white Ms. Breyer and May's study indicated that black Ss imitated the black Ms. Finally, Thelen's study indicated there was no difference in the imitation of black or white Ms by black subjects.

An added fact is that none of the above studies dealt with Chicano models or subjects. The ages of the subjects in the above studies varied from kindergarten children to high school students. The sum of these results suggests that any conclusion stated about the effect of race of S and M on the modeling phenomenon must be made in very tentative terms.

Mode of Modeling Studies

The last category of independent variable, the mode of modeling, bears mentioning. Few studies have experimentally manipulated the mode of modeling. While various studies have incorporated or used different modes, live, audio taped or video taped or written modeling, these same studies have not attempted to methodologically compare or contrast them.

Nevertheless, a few investigators have attempted to understand the effect of either live or symbolic modeling on rule-governed behavior. In two studies by Harris and Evans (in press and manuscript) symbolic written models were used to assess the effect of modeling upon the creative behavior of college students. In both studies it was revealed that a single minutes exposure to a written model was sufficient to alter the creative behavior of these students.

The majority of studies which have manipulated the mode have occurred in the area of psycho-therapy. Bandura and Menlove (1968) compared multiple models and single models with a no-model procedure and with each other in the treatment of dog phobia in nursery school children. Both multiple and single model procedures surpassed the no-model condition and the multiple model procedure was also superior to the single model procedure.

Spiegler, Liebert, McMains and Fernandez (1969) conducted several studies which used filmed models in the treatment of snake phobia.

They attempted to assess the effects of the visual and auditory parts of the modeling film. Furthermore, the modeling film treatment was compared with a no-model control treatment. It was found that modeling was superior to the no-model condition and that both the visual and auditory components were necessary for the effective treatment of the snake phobia.

The available research studies present an intriguing picture. Quite clearly, knowledge about social learning theory, modeling, observational learning effects and the attentional variables is incomplete. It is partially because of the need for additional knowledge of these phenomena that this study was undertaken.

CHAPTER 3

DESIGN OF STUDY

Subjects, Models, and Experimenter

Two hundred eight students were randomly drawn from eleven sixth grade classes in four elementary schools in Albuquerque, New Mexico. There were equal number of boys (104), and girls (104), as well as equal numbers of Mexican-American (Chicano) and Anglo-American students (104). Eight boys (four Chicano and four Anglo), and eight girls (four Chicano and four Anglo), were randomly assigned to each of the twelve experimental conditions and to the control group.

There were three modes of modeling used: live, audio-taped, and written. Within each mode, two model characteristics were experimentally manipulated: age of model (adult and peer) and ethnicity of model (Anglo and Chicano). Consequently, for each mode, four different models were required:

1. Anglo-adult model
2. Chicano-adult model
3. Anglo-peer model
4. Chicano-peer model

In order to maximize the modeling effects and to minimize the possibility that those effects could be due to the characteristics of a single model, twelve male individuals (six adults and six peers) were used as models for each of the modes. Three male models for each of the four above types were trained and used in the live and taped modes. Six adult male models were trained in the live and taped modeling procedures. Three were of Anglo surname and appearance and three were of Spanish surname and appearance. Likewise, six sixth grade boys from a fifth Albuquerque elementary school were trained and used in the live and audio-taped conditions. Three were of Anglo surname and appearance and three were of Mexican-American surname and appearance. These boys were either eleven or twelve years old. The written models were identified only by the names and ages of the twelve models used in the other two modeling conditions.

The experimenter was a 32 year old male, Anglo graduate student.

Stimulus Material

Two parallel but different sets of twelve stimulus pictures were produced and utilized as the modeling materials. These sets were developed in a pilot study.

In the pilot study a series of thirty-five pictures or line drawings of people or animals involved in common activities were presented to four groups of eight sixth grade Mexican-American, Anglo-American, male and female students. Each student was requested to look at each of the pictures and then instructed to "Please make up a sentence about this picture. Please write your sentence." The accumulated data were analyzed according to the criteria of (1) presence or absence of a prepositional phrase; (2) presence or absence of a relative clause; (3) presence or absence of a valuational preference semantic category; and (4) length of the sentence. Based on these data as well as the apparent ease of response, i.e., those pictures which generated a high proportion of complete sentences, the twenty-four pictures which had generated complete sentences were selected and randomly divided into two parallel sets.

Each picture was a line drawing of a person (or persons) or an animal engaged in a familiar activity. (See Appendix B.) The first set of pictures was the stimulus set for the model's statements in the experimental variations. This same set was immediately reshown to all subjects in order to assess experimental group imitation. The second set of pictures was subsequently displayed to the experimental groups without modeling in order to assess generalization. Both sets of pictures were shown to the control group; the first set was shown without modeling and was followed by the second set of pictures.

Model's Statements

The modeled statements each exhibited at least one example of a prepositional phrase, e.g., ". . . on a court," ". . . with each other," and a relative clause, e.g., ". . . who is lying," "which carries the baby." (These two constructions composed the two "syntactic" structures.) Each modeled sentence also incorporated a valuational-preference-belief, "semantic" structure or category, e.g., "Tom believes the best barber . . . ," "The player considers himself to be the best player . . . ." (The complete set of modeled sentences is provided in Appendix C.) The mean sentence length for the twelve modeled sentence was 15.25 words.

Procedure

A common procedure was utilized with all experimental and control groups. This procedure varied only in terms of the modeling condition.

The _Ss_ were called from their classrooms and escorted by the _E_ to the experimental site. For all groups the _E_ stated to the _Ss_:

> I am interested in how people make up sentences and today I want to find out how you make up sentences.

Live Mode

In the live mode, the E continued:

> Before you make up sentences, there is another person here who is going to compose sentences about these pictures. Please listen.

The M was asked to state his name by the E. (The adult Ms preceded their names with "Mr." while the peer Ms did not.) E said to the M"

> I want you to make up a sentence about each of these pictures.

The E indicated the set of twelve pictures and gave a copy to the M. The modeled sentences were lightly penciled on the pictures. The E said to the Ss:

> I want you students to watch and listen to [name of M] as he makes up a sentence about each of these pictures. I will show you the pictures.

The E first showed the pictures to the M and then turned it to the assembled Ss. For each picture, the E said:

> Please make up a sentence about this picture.

The M then "composed" the preconceived sentence. Upon completion of the twelve item set, the M was thanked and attention was turned to the Ss.

Audio-taped Mode

In the audio-taped mode, the E continued:

> Before you make up sentences, I want you to listen to this tape recording I have. The person recorded on the tape made up sentences about these pictures.

The E indicated the set of pictures and said:

> Please listen as this person makes up a sentence about each of these pictures.

The tape contained a dialogue between the E and the M. The M was asked to state his name and age. The adult Ms preceded their names with "Mr." while the peer Ms did not. The E stated to the M:

> I want you to make up a sentence about each of these pictures.

The tape recorder was momentarily stopped while the E said to the Ss:

> I want you students to listen to [name of M] as he makes up a sentence about each of these pictures. I will show you the pictures.

The recorder was restarted and the E said to the M for each of the twelve pictures:

> Please make up a sentence about this picture.

The M then "composed" the selected sentence. Upon completion of this set, the M was thanked, the tape recorder was turned off, and attention turned to the Ss.

Written Mode

In the written condition the E continued:

> Before you make up sentences, I want you to look at and read the papers I am going to give you.

E distributed the set of stimulus pictures, which was headed by a cover sheet with the name and age of the symbolic M printed thereon.

Each picture was distinguished by the inclusion of the modeled sentence handwritten at the bottom of the page. The E stated to the Ss:

> The person whose name is on the first page [the E read the name] looked at each of these pictures and then wrote a sentence about each one. He wrote each of his sentences at the bottom of each picture and copies of those pictures were then made.
>
> I want you to look at each of these pictures and to read each sentence.

Since it was found that some Ss had difficulty in reading the sentences because of the style of handwriting, the sentences were read aloud. As the E held up each of the twelve pictures, the Ss followed suit and the sentences were read aloud. Upon completion of the twelve item set, the written modeled sentences were collected.

These three procedures entailed the modeling procedure for each of the three modes. At this point, the remaining procedure was nearly identical for all experimental groups. The E stated:

> Now that you listened to [name of M] [for the written mode the phrase "looked at and read" sentences composed by (name of M)], I want you to make up sentences about the same pictures. But before you do that, I want you to write your name and the name of your school on this sheet of paper.

After a pause, the E continued:

> Since I cannot write down each of the sentences you make up, I want you to write your sentences on the same sheet of paper.

For each of the twelve pictures, the E held up the picture and said:

> Please make up a sentence about this picture, Please write your sentence.

Upon completion, the Ss sheets were collected and new sheets were distributed to the Ss. The E instructed the Ss:

> Now I want to see how each of you makes up sentences about these twelve new pictures. Again I want you to write your name and school on the sheet of paper.

For each of the twelve new pictures, the picture was held up and the E stated:

> Please make up and write a sentence about this picture.

Upon completion of this set, which corresponded to the generalization phase, the papers were collected, the Ss were asked not to discuss their experience, thanked, and dismissed.

Control Group

The control group Ss were treated identically to the experimental Ss with the important exception that they were not exposed to a M. They were merely told that the E was interested in discovering how they made up sentences. They were shown the same pictures, in the same order, as the modeling Ss and asked to write their sentences.

Pilot Study

The pilot study, as mentioned, was conducted not only to determine which twenty-four pictures were to be used as the stimulus sets but also to determine the frequency of responses incorporating the valuation-preference category, relative clauses, and prepositional phrases. The results of the pilot study clearly showed that, while prepositional phrases were used frequently, relative clauses were never used. Furthermore, no student in the sample composed any sentences with a valuation category structure. A small number of Ss did include terms like good, bad, pretty, etc. The overwhelming majority of complete sentences entailed simple descriptions of the person or animal portrayed.

Dependent Measures

Because of the results of the pilot study, two additional dependent measures were added to the original four. Those original measures were relative clauses, prepositional phrases, valuation category, and length. Those added were other value structures and combination values, the latter being the sum of the valuation category and other value totals. Therefore, with the two phases, imitation and generalization, there were twelve dependent measures.

Scoring

Each response was scored for number of words, number of relative clauses, number of prepositional phrases, number of valuation category phrases, number of other value structures, and number of combination values. Scoring was done with the identity of the Ss and school unknown to the scorer. The S's experimental or control variation was also unknown by the scorer.

Each measure was scored according to a specified rule. Length was determined by counting the number of words per response. Contractions such as "can't," "isn't," etc., were counted as one word. Relative clauses were counted and the number per response noted. A relative clause was defined as a construction headed by a relative pronoun (who, that, which) and following a noun phrase, e.g., "The man who is brushing . . . ," "The kangaroo which carries the baby in the pouch . . . ." The number of prepositional phrases per response were counted; these phrases were defined as a phrase following the order preposition + article + noun, e.g., "on a court," "in the pouch," etc. The valuation category was determined by the rule which stated that if a value, preference, opinion, or belief attributable to the pictured person or animal was stated in the sentence's predicate, e.g., "The girl would rather play tennis . . . ," "The boy likes to eat spaghetti . . . ," then a valuation category construction was present. The other value category was determined by the rule which stated that if any word or phrase expressing a value, preference or belief such as "good," "bad," "favorite," "ugly," "pretty," etc., then an other value construction was present.

The combination value was simply the sum total of the valuation category and the other value category.

Reliability

A thirty percent sample of the results was independently scored by a second judge in order to estimate the inter-rater reliability. Pearson product moment correlations were calculated for each of the twelve measures. Each of the twelve correlation coefficients exceeded +.90. They ranged from a perfect correlation of +1.00 for length (Imitation and generalization phases) and prepositional phrases (Imitation and generalization phases) to .92 for the valuation category - Imitation phase.

Overall Design

There were forty-eight experimental conditions, which varied mode of modeling (live, audio-taped, and written), age of M (adult and peer), ethnicity of M (Anglo and Chicano), ethnicity of S (Anglo and Chicano) and sex of S (male and female) in a 3 x 2 x 2 x 2 x 2 design plus four control (no-model) control groups which varied ethnicity and sex of Ss. There were two phases, imitation and generalization, each one with twelve dependent measures. The total number of responses in each of the six categories combined across the twelve stimuli for each S was used as the basic datum.

CHAPTER 4

RESULTS

The results of this study are presented according to the following schema: (1) Control Group Results, (2) Modeling Groups versus Control Group Results, and (3) Modeling Groups' Results. Each section is divided into Imitation Phase and Generalization Phase results.

The means and standard deviations for each of the fifty-two groups (forty-eight modeling experimental and four control groups) are shown in Table 1, page 72.

Control Group Results

Imitation phase. The scores for the Valuational, Other Value and Combination Values categories, because of the high incidence of zero scores, were analyzed by Chi-square analyses. Each of these analyses was non-significant. (Chi-square values = 2.00, 0.0, 0.748, all df = 1 for Valuational, Other Value and Combination Values respectively.) The data from the relative clause measure were not analyzed since no S in any of the four control groups wrote any of these structures. Two (S ethnicity) x two (S sex) analyses of variance were performed on the prepositional phrase data and the length data. No significant main effects or interaction effect were found for either measure (see Tables 2 and 3, page 83).

Generalization phase. The Chi-square analyses performed on the Valuational, Other Value, and Combination Values categories revealed no significant departures from the expected values. (Chi-square values =

0.748, 2.00, 0.138, all df = 1 for Valuational, Other Value, and Combination Values respectively.) Since no *S* recorded any relative clauses, no statistical analyses were needed. The 2 x 2 analysis of variance performed on the prepositional phrase data indicated no significant main or interaction effects (see Table 4, page 84). The multiple classification analysis of variance employed to analyze the length data indicated a significant main effect for sex (F = 5.007, df = 1,12, $p < .05$). No other main effect or interaction was found (see Table 5, page 84). Inspection of the mean number of words written by males and females demonstrated that female *Ss* wrote more words ($\bar{X}$ = 88.125) than male *Ss* ($\bar{X}$ = 73.00).

Modeling Group Results versus Control Group Results

Imitation phase. All scores were initially analyzed by thirteen group one way analyses of variance, collapsing across ethnic group and sex of *S*. The analysis of the Valuational Category data (see Table 6, page 85) revealed a significant effect (F = 7.222, df = 12,195, $p < .01$). An *a priori* comparison of the twelve modeling group with the control group mean using Scheffe's test revealed a highly significant modeling effect (F = 48.230, df = 1,195, $p < .001$).

The analysis of variance for the Other Value category yielded a significant overall effect (F = 2.145), df = 12,195, $p < .025$), as seen in Table 7, page 85. An *a priori* Scheffe's comparison of the modeling groups' mean with the control group mean revealed a significant difference (F = 5.624, df = 1,195, $p < .025$) with the modeling groups' mean being greater.

The Combination Values category scores were subjected to the one way analysis of variance, which indicated a significant effect ($F = 6.708$, $df = 12,195$, $p < .001$) (see Table 8, page 86). Scheffe's *a priori* test was used to compare the mean scores for the control group with the twelve modeling groups; a significant difference was found ($F = 53.972$, $df = 1,195$, $p < .001$), indicating a strong modeling effect.

The analysis of variance for the relative clause scores also revealed a significant effect ($F = 2.259$, $df = 12,195$, $p < .01$) (see Table 9, page 86). The *a priori* comparison of group means using Scheffe's method showed that the modeling groups' mean was significantly greater than the control group mean ($F = 6.638$, $df = 1,195$, $p < .01$).

No significant effect was found for the prepositional phrase data when analyzed with an analysis of variance ($F = 1.24$, $df = 12,195$, $p > .05$) (see Table 10, page 87).

A significant overall effect was found for the length data ($F = 3.222$, $df = 12,195$, $p < .001$) (see Table 11, page 87). The comparison of the twelve modeling groups' mean with the control group mean using Scheffe's *a priori* test revealed a significant difference in the direction of the modeling groups ($F = 23,823$, $df = 1,195$, $p < .001$).

Generalization phase. A one way analysis of variance of the Valuational Category failed to reveal a significant effect ($F = 1.74$, $df = 12,195$, $p > .05$) (see Table 12, page 88). Nevertheless, the fact that this F value approached the value needed for significance (1.79 at $p < .05$) suggested that such an effect was present.

A significant overall effect was revealed for the Other Value scores ($F = 2.715$, $df = 12{,}195$, $p < .01$) (see Table 13, page 88). The comparison of the modeling groups' mean with the control group mean using Scheffe's *a priori* test revealed a non-significant difference ($F = 3.117$, $df = 1{,}195$, $p > .05$).

The analysis of variance of the Combination Values category yielded a significant effect ($F = 1.799$, $df = 12{,}195$, $p < .05$) (see Table 14, page 89). A modeling effect was indicated by the significant F value ($F = 8.16$, $df = 1{,}195$, $p < .01$) found as a result of the Scheffe's *a priori* test used to compare the group means.

While the result of the one way analysis of variance for the relative clause data revealed a significant effect ($F = 2.248$, $df = 12{,}195$, $p < .01$) (see Table 15, page 89), comparison of the control group mean with the modeling groups' mean using Scheffe's *a priori* test revealed no significant difference ($F = 1.625$, $df = 1{,}195$, $p > .05$).

The one way analysis of variance of the prepositional phrase scores indicated a significant effect ($F = 3.404$, $df = 12{,}195$, $p < .001$) (see Table 16, page 90). A Scheffe's *a priori* test performed on the group means in order to compare them revealed a significant difference which indicated a modeling effect ($F = 13.316$, $df = 1{,}195$, $p < .001$).

The length data were analyzed by a one way analysis of variance, and a significant effect ($F = 3.362$, $df = 12{,}195$, $p < .001$) was revealed (see Table 17, page 90). A significant modeling effect ($F = 18.757$, $df = 1{,}195$, $p < .001$) was found when the modeling groups' mean was compared with the control group mean using Scheffe's *a priori* test.

Modeling Groups' Results

Imitation phase. The 3 (mode of modeling) x 2 (age of model) x 2 (ethnicity of model) x 2 (ethnicity of subject) x 2 (sex of subject) analysis of variance performed on the Valuational Category revealed a strong main effect for mode of modeling ($F = 12.958$, $df = 2,144$, $p < .001$) and a significant interaction between M age and S sex ($F = 6.864$, $df = 1,144$, $p < .05$). No other significant main or interaction effects were found (see Table 18, page 91). The means for the Ss exposed to the three modes were compared using Scheffe's a priori test. There was no significant difference between the means of the live and taped mode Ss ($F = 0.2436$, $df = 1,144$, $p > .05$). The means for the live mode Ss ($\overline{X} = 7.000$) significantly exceeded that for the written mode Ss ($\overline{X} = 4.359$) ($F = 21.481$, $df = 1,144$, $p < .001$). The mean of the Ss in the taped condition ($\overline{X} = 6.719$) also significantly exceeded the mean of the Ss exposed to the written mode ($F = 17.149$, $df = 1,144$, $p < .001$). Examination of the data related to M age and the S sex indicated that male Ss tended to imitate the adult Ms ($\overline{X} = 6.604$) more than peer Ms ($\overline{X} = 5.166$), while female Ss imitated peer Ms ($\overline{X} = 6.666$) more than adult Ms ($\overline{X} = 5.666$).

The five factor analysis of variance of the Other Value data revealed only a significant second order interaction between mode of modeling, M age, and M ethnicity ($F = 4.472$, $df = 2,144$, $p < .01$) (see Table 19, page 92). In general, the scores for Ss exposed to the written models exceeded the scores for Ss who observed the other two types of models. Furthermore, the scores for the Ss exposed to Anglo adult and

Chicano peer models tended to be higher than scores for subjects who observed Anglo peer and Chicano adult models.

The multiple classification analysis of variance performed on the Combination Values category data indicated a highly significant main effect for mode of modeling ($F = 8.236$, $df = 2,144$, $p < .001$) and a significant interaction effect of *M* age and *S* sex ($F = 5.336$, $df = 1,144$, $p < .01$) (see Table 20, page 93). Means for *Ss* exposed to the three modes were compared using Scheffe's *a priori* method which indicated that the mean for the *Ss* exposed to the live mode ($\bar{X} = 8.015$) significantly exceeded the mean for the written mode *Ss* ($\bar{X} = 5.734$) ($F = 13.361$, $df = 1,144$, $p < .001$) as did the mean of the taped mode *Ss* ($\bar{X} = 7.828$) ($F = 11.255$, $df = 1,144$, $p < .001$). The means for the live and taped mode *Ss* did not significantly differ. The *M* age and *S* sex interaction effect was such that while male *Ss* imitated adult *Ms* ($\bar{X} = 7.771$) more than peer *Ms* ($\bar{X} = 6.229$), female *Ss* imitated peer *Ms* ($\bar{X} = 7.792$) more than adult *Ms* ($\bar{X} = 6.978$).

The five factor analysis of variance performed on the relative clause data revealed a significant main effect for *M* age ($F = 4.529$, $df = 1,144$, $p < .001$), a significant interaction effect for mode of modeling and *M* ethnicity ($F = 3.813$, $df = 2,144$, $p < .05$) and a significant second order interaction between *M* age, *M* ethnicity and *S* sex ($F = 4.237$, $df = 1,144$, $p < .05$) (see Table 21, page 94). Inspection of the mean scores for the *M* age effect indicated that the mean for *Ss* exposed to adult *Ms* ($\bar{X} = 1.6146$) was greater than the mean score for *Ss* exposed to peer *Ms* ($\bar{X} = 0.9792$). The mode of modeling by *M* ethnicity interaction showed that *Ss* exposed to live ($\bar{X} = 1.8125$) and taped Anglo

Ms ($\bar{X} = 1.6875$) had higher scores than *Ss* exposed to the live ($\bar{X} = 1.3125$) and taped Chicano *Ms* ($\bar{X} = 0.8125$). The opposite effect was found in the case of means for *Ss* exposed to written *Ms*. *Ss* exposed to written Chicano models had higher scores ($\bar{X} = 1.5938$) than *Ss* who observed written Anglo models ($\bar{X} = 0.5625$). Inspection of the scores related to the interaction between *M* age, *M* ethnicity, and *S* sex indicated that female *Ss* who observed adult and peer Anglo models and males who observed adult and peer Chicano models had scores more like one another than female subjects who observed adult and peer Chicano models or males who observed adult and peer Anglo models. Furthermore, *Ss* who were exposed to adult models, either Anglo or Chicano, had higher scores than *Ss* who observed the peer models.

No significant main effects or interaction effects were found as a result of the multiple classification analyses of variance of the prepositional phrase data (see Table 22, page 95) and the length data (see Table 23, page 96).

Generalization phase. The multiple classification analysis of variance of the Valuational Category resulted in a significant mode of modeling main effect ($F = 3.505$, *df* = 2,144, $p < .05$) and significant interactions between *M* age and *S* sex ($F = 4.112$, *df* = 1,144, $p < .05$) and between mode, *M* age, *M* ethnicity, *S* ethnicity and *S* sex ($F = 3.462$, *df* = 2,144, $p < .05$). No other significant effects were found (see Table 24, page 97). A multiple comparison, using Scheffe's *a priori* test, of the means of *Ss* observing the different modes revealed that the mean of the live mode *Ss* ($\bar{X} = 2.0156$) significantly exceeded the mean of the written mode *Ss* ($\bar{X} = 1.0468$) ($F = 6.3718$, *df* = 1,144,

$p < .025$), and the mean of the taped mode *Ss* ($\bar{X} = 1.7968$) was also significantly greater than scores for *Ss* who read the written *M* ($F = 3.848$, $df = 1,144$, $p < .05$). There was no significant difference between the means of the live and taped mode *Ss*. The *M* age and *S* sex interaction indicated that male *Ss* imitated adult *Ms* more ($\bar{X} = 1.979$) than peer *Ms* ($\bar{X} = 1.209$), while female *Ss* imitated peer *Ms* more ($\bar{X} = 1.895$) than adult *Ms* ($\bar{X} = 1.397$). The significant fourth order interaction between mode, *M* age, *M* ethnicity, *S* ethnicity, and *S* sex was of such a complex nature that reasonable explanation was impossible.

The Other Value category five factor analysis of variance revealed a significant main effect for *S* ethnicity ($F = 5.649$, $df = 1,144$, $p < .01$) and a significant interaction between mode of modeling, *M* age and *M* ethnicity ($F = 4.412$, $df = 2,144$, $p < .05$) and a significant third order interaction between mode of modeling, *M* age, *M* ethnicity and *S* sex ($F = 4.224$, $df = 2,144$, $p < .05$) (see Table 25, page 98). Inspection of group means indicated that Anglo *Ss* gave more Other Value items ($\bar{X} = 0.6979$) than Chicano *Ss* ($\bar{X} = 0.3854$). The interaction between mode of modeling, *M* age, and *M* ethnicity was such that *Ss* who observed live and written adult Chicano and peer Anglo models tended to score higher than *Ss* who observed live and written adult Anglo and peer Chicano models. *Ss* who experienced taped models showed the opposite effect. Investigation of scores relative to the significant third order interaction indicated a tendency for female *Ss* to imitate the live, taped and written adult Anglo and peer Chicano models more than their male counterparts. Male *Ss* tended to imitate the live adult Chicano and live peer Anglo models more than female *Ss*. Little difference was found between the scores of male and female *Ss* who observed the taped and written adult Chicano and peer Anglo models.

A significant interaction effect between mode of modeling and *S* sex ($F = 3.284$, $df = 2,144$, $p < .05$) was revealed by the multiple classification analysis of variance of the Combination Values data (see Table 26, page 99). It was found that male *Ss* exposed to the live mode had higher scores ($\bar{X} = 3.25$) than female *Ss* ($\bar{X} = 2.094$), while female *Ss* scored higher in the taped ($\bar{X} = 2.594$) and written modes ($\bar{X} = 2.031$) than did male *Ss* (taped $\bar{X} = 1.719$; written $\bar{X} = 1.281$).

The multiple classification five factor analysis of variance of the relative clause data revealed a significant main effect for *M* age ($F = 4.357$, $df = 1,144$, $p < .05$), a significant interaction effect of *M* age and *M* ethnicity ($F = 3.859$, $df = 1,144$, $p < .05$); and a significant interaction between mode, *M* age, *M* ethnicity, and *S* sex ($F = 3.064$, $df = 1,144$, $p < .05$). No other significant effects or interactions were found (see Table 27, page 100). The examination of the mean scores of *Ss* exposed to adult Ms revealed that they wrote more relative clauses ($X = 0.5625$) than the *Ss* exposed to peer *Ms* ($X = 0.2183$). The interaction between *M* age and *M* ethnicity demonstrated that *Ss* exposed to Anglo adult *Ms* had lower scores ($\bar{X} = 0.291$) than *Ss* exposed to Chicano adult *Ms* ($\bar{X} = 0.833$). However, *Ss* exposed to Anglo peer *Ms* had higher scores ($\bar{X} = 0.271$) than *Ss* who observed Chicano peer *Ms* ($\bar{X} = 0.146$). Inspection of scores pertinent to the interaction between mode, *M* age, *M* ethnicity and *S* sex indicated that in the live mode male *Ss* tended to imitate the adult Anglo and Chicano models more than did the female *Ss*, but that there was little difference in the scores of *Ss* who observed peer models. In the taped mode, female Ss had higher scores than male Ss when they were exposed to either an adult model or a peer Anglo model. In the written mode, male Ss who observed the adult Chicano and the peer Anglo model tended to have higher scores than the female Ss in the same condition.

The analysis of variance of the prepositional phrase data revealed a significant interaction effect between M age and M ethnicity ($F = 5.702$, $df = 1,144$, $p < .01$). No other significant main or interaction effects were found (see Table 28, page 101). According to the data, Ss observing Anglo adult Ms ($\bar{X} = 5.729$) had lower scores than Ss who observed Chicano adult Ms ($\bar{X} = 6.813$), while Ss exposed to Anglo peer Ms ($\bar{X} = 6.333$) had higher scores than Ss exposed to Chicano peer Ms ($\bar{X} = 5.479$).

A five factor analysis of variance performed on the length data revealed a first order interaction effect between mode of modeling and M age ($F = 4.569$, $df = 2,144$, $p < .05$) and a third order interaction effect of M age, M ethnicity, S ethnicity and S sex ($F = 5.108$, $df = 1,144$, $p < .05$). No other significant effects were found (see Table 29, page 102). The first order interaction was characterized by Ss exposed to live adult Ms ($\bar{X} = 110.625$) and written Ms ($\bar{X} = 115.750$) writing more words than Ss exposed to live peer Ms ($\bar{X} = 100.375$) and written peer Ms ($\bar{X} = 107.094$), while Ss hearing taped adult Ms wrote fewer words ($\bar{X} = 103.125$) than Ss who heard the taped peer Ms ($\bar{X} = 118.250$). The significant third order interaction between M age, M ethnicity, S ethnicity, and S sex indicated that female Ss exposed to peer models wrote longer sentences than did the male Ss. However, for the Ss exposed to adult models, the results were less clear. In general, the Anglo Ss of both sexes wrote longer sentences than the Chicano Ss; female Ss again tended to write longer sentences than the male Ss.

Summary

Table 30, page 103, presents a summary of the significant and major results of this study. It includes only the significant main and first order interaction effects.

A modeling effect, such that the means for Ss in the modeling groups were greater than the means for Ss in the control groups, was demonstrated for all measures with the exception of the Valuational Category--Generalization Phase, Other Value--Generalization Phase, relative clause--Generalization Phase, and prepositional phrase--Imitation Phase.

For the forty-eight modeling groups, a main effect was found for the mode of modeling for the Valuational Category--Imitation and Generalization Phases and the Combination Values--Imitation Phase. Further analysis indicated that, while live and taped modes did not differ, both live and taped mode Ss scored significantly higher than written mode Ss.

The sole significant main effect for M age was found with the relative clause--Imitation and Generalization Phases. Ss who observed adult Ms scored higher than Ss who observed peer Ms.

There was no significant main effect for M ethnicity.

The sole significant effect for S ethnicity was found for the Other Value--Generalization Phase. Anglo Ss had higher scores than Chicano Ss.

Only the control group yielded a significant main effect for S sex. For the length--Generalization Phase female Ss scored higher than males.

The only significant first order interaction effect between mode and M age was found for length--Generalization Phase data; Ss who observed live and written adult Ms had higher scores than Ss who observed live and written peer Ms, while Ss who observed taped peer Ms scored higher than Ss who observed taped adult Ms.

Mode and M ethnicity interacted only for the relative clause--Imitation Phase data such that Ss who were exposed to live Anglo and taped Anglo Ms had higher scores than Ss exposed to live and taped Chicano Ms and Ss who observed written Chicano Ms had higher scores than Ss exposed to written Anglo Ms.

Mode and S sex interacted such that male Ss who observed live Ms had higher scores on the Combination Values--Generalization Phase measure than did female Ss, while female Ss' scores exceeded those of the male Ss for taped and written modes.

M age and M ethnicity interacted for the relative clause--Generalization Phase and prepositional phrase--Generalization Phase data. In both cases, Ss exposed to Anglo adult Ms had scores lower than the means for Ss exposed to Chicano adult Ms, whereas Ss who observed Anglo peer Ms had scores higher than Ss exposed to Chicano peer Ms.

The M age and S sex variables significantly interacted for the Valuational Category--Imitation and Generalization Phases and for the Combination Values--Imitation Phase measures. In all cases, male

Ss scored higher when they observed adult Ms, while female Ss had higher scores when they were exposed to peer Ms.

CHAPTER 5

DISCUSSION AND CONCLUSIONS

The results of this study indicated that sixth grade students, with neither explicit or implicit instructions to imitate nor reinforcement, were able to abstract rules governing the use of modeled sentences and subsequently to use those rules to generate new sentences in response to novel stimuli. In particular, the modeling group students abstracted the rules governing the valuational categories and relative clauses and then used those rules in both imitative and novel tasks to write sentences which expressed the modeled values and syntactic structures, whereas the no-model control students did not write sentences with the same number of value or syntactic structures. The modeling effect, since it occurred without instructions and reinforcement, provides further evidence that imitation of models can occur without them (Bandura, 1969). Also, whereas Rosenthal and Carroll (1972) found a modeling effect with rule-governed cognitive behaviors while using strong instructions and Rosenthal and Whitebook (1970) found a modeling effect with similar behaviors using both instructions and incentives, this study's results occurred with neither. Therefore, this finding supports the conclusion that the imitation of models who display rule-governed cognitive language behaviors can occur without instructions and reinforcement (Rosenthal, Zimmerman and Durning, 1971).

Although this study demonstrated the role of modeling on the performance and use of rule-governed language structures, it did not demonstrate the role of modeling on the acquisition of the linguistic rules or the general role of modeling in language acquisition. Like other studies concerned with rule-governed language behaviors (Bandura and Harris, 1966; Odum, Liebert and Hill, 1968; Rosenthal, Zimmerman and Durning, 1971), this study dealt with the linguistic performance of the subjects rather than their linguistic competence. The results did relate to the communicative competence of the students (Hymes, 1966; Cooper, 1970); the role of modeling procedures in the acquisition of the social rules inherent to this competence was demonstrated. Clearly, the subjects did abstract the social rules implicit to the situation of this study, rules which were also related to the performance of the linguistic structures.

The results only partially clarified the role and influence of specified attentional variables within the social learning theory paradigm. It was indicated that the mode of modeling and the age of model had some effects upon the abstraction and imitation of the modeled language categories. Moreover, both the mode of modeling and the age of model contributed to the modeling effect when they interacted with other factors, particularly the sex of the observer. The ethnicity of the model, like that of the observer, had little effect upon the modeling phenomenon. The latter observation tends to corroborate the conclusion of Harris and Hassemer (1972) that the language (Spanish or English) used by the model had no effect. The sex of the observer alone had no apparent effect upon the outcomes although it did seem to interact significantly with age of model.

The lack of uniformity of findings for the linguistic behaviors and in the two phases is disconcerting, a fact which makes the interpretation and explanation of the results difficult. Furthermore, confirmation of the hypotheses is tempered by this lack of consistency.

Confirmation of the Hypotheses

With the exceptions of the Valuational Category--Generalization Phase, Other Value--Generalization Phase, relative clause--Generalization Phase and the prepositional phrase--Imitation Phase, Hypothesis #1 was confirmed for all measures. However, the first three of these exceptions were found to nominally support the hypothesis. Although the Valuational Category data failed to achieve a significant level, the F value (F = 1.74) clearly approached the required level (F of 1.79 needed for significance at $p < .05$), a fact which suggested the presence of a modeling effect. The means for the Other Value measure failed to register as significantly different when compared with Scheffe's *a priori* test. Inspection of the group means revealed that one modeling group had a mean score of zero. This score was eliminated and a comparison of the remaining eleven groups' mean with the control group's mean using Scheffe's *a priori* test revealed a significant modeling effect (F = 3.87, df = 11,180, $p < .05$). Also meaningful was the finding that, although the scores for the modeling groups for the Valuational Category and Other Value did not significantly differ from the control's, analyses of the Combination Values data revealed a significant modeling effect. Finally, even though the multiple comparison of the group means (using Scheffe's *a priori* test) of the relative clause measure failed to indicate a significant statistical difference, it was found that the mean score for the control group equaled zero, while eleven of the twelve modeling groups did write relative clauses in the Generalization Phase. This fact is indicative of the significance (non-statistical) of the modeling procedures.

The prepositional phrase--Imitation Phase data did not confirm the hypothesis. It has been well documented that prepositions are commonly used by young students (Bandura and Harris, 1966), a fact which may explain the absence of a significant modeling effect. The pilot study also indicated that prepositional phrases were commonly used by sixth graders in written form. Nevertheless, the data for the prepositional phrases--Generalization Phase indicated a modeling effect as well as an increase in the mean number of these structures in the Generalization Phase ($\overline{X} = 6.13$) over those in the Imitation Phase ($\overline{X} = 5.8$). This increase suggests that a delayed, latent modeling effect was generated by the modeling procedures. This conclusion is analogous to that made by Harris and Hassemer (1972) that the modeling effect associated with the complexity of sentences used by children persists over time. However, this conclusion must be tempered since the time gap between the two phases in this study and between the complex and simple phases in the Harris and Hassemer study was relatively brief, i.e., probably no more than five minutes.

Hypothesis #2 was confirmed to the extent that for the two Valuational Category measures and the Combination Values--Imitation Phase, the scores for Ss exposed to live and taped modes of modeling were greater than those for Ss who experienced the written mode. The fact that the other measures did not reflect this effect (although the modeling groups did differ from the no-model group) suggests that the mode of modeling had little effect, although modeling itself does make a significant difference.

It was overwhelmingly evident that the ethnicity and sex of the observer had little effect upon the outcomes and, consequently, were judged to be relatively unimportant as variables within the attentional set. Because of the lack of effect, Hypothesis #3 was confirmed.

As predicted, no main effect was revealed for the ethnicity of the model. Contrary to Hypothesis #4, no interaction of the M ethnicity and S ethnicity was found.

Hypothesis #5 failed to receive confirmation, although for the two relative clause measures a main effect for age of model was found. This effect, however, was in the direction opposite of that predicted; Ss exposed to adult Ms scored higher than Ss observing peer Ms. While no other significant differences in any direction were found, eight of the remaining ten measures demonstrated that the mean scores for Ss exposed to adult Ms were higher than means of Ss exposed to peer Ms. Model age attribute also interacted with other variables, especially sex of S, ethnicity of model, and mode of modeling. These findings seem to be evidence supporting the conclusion that the age of the model does exert considerable influence upon the modeling phenomenon. It is suggested that the main effect for M age was due to the students attributing to the adult models a status similar to a teacher, a person who looms important in the lives of the students. Granting that the adult models were viewed as "teachers" (or surrogate teachers), it is not surprising to find more imitation of them than of their peers, particularly for the complex language structure like relative clauses. The age of model and sex of subject interaction revealed that peer models also exerted some influence. This interaction may have been the result of the influence of the peer groupings that do emerge in the middle childhood ages. It has been found that girls are more likely to conform to peer suggestions than boys (Mussen, Conger and Kagan, 1969). The result that female subjects who were exposed to peer Ms imitated or conformed more to those models than female subjects who observed adult models supports this contention.

Although no other interaction effects were predicted, a small number of second, third and fourth order interactions were significant. These are, however, of such complexity that they resist reasonable interpretation. In some cases, their significance could well be attributed to chance occurrence.

Mimicry

Much like the results of the Rosenthal, Zimmerman and Durning (1971) study, no mimicry or precise imitation of the models and the modeled sentences were found. This lack of mimicry further supports the social learning theory belief that modeling procedures can be used for more than engendering mere duplication or copying of the model's response. Rather, modeling procedures clearly seem to have the effect of leading subjects to generate new and creative responses, but responses which conform to the modeled rule-governed behaviors.

Non-modeled Responses

One interesting feature of modeling phenomenon has been that non-modeled responses or a class of responses may be acquired in addition to the increase in performance of modeled responses. The case of the Other Value structures appears to be a confirmation of this features. Although it was found that many subjects did include valuational perference statements labeled "Other Value" in their responses, these statements or structures were not aspects of the modeled sentences. Only three of the twelve modeled sentences included these terms, with all three examples being the word "best." Analysis of the data revealed, however, that a high proportion of Other Value statements, especially in the Imitation Phase, were written by the subjects. Their presence indicates that the modeling effect involves the use of non-modeled responses. In fact, the students, in the case of the Valuational Category, acquired social rules (or, at least, learned to perform these rules) related to a valuation preference category of greater dimensions than the modeled structures. Therefore, within the modeling phenomenon there exist cognitive features and activities used by the subjects. The students, similar to those subjects used by Odum, Liebert and Hill (1968), and Liebert, Odum, Hill and Huff (1969), seemed to employ problem solving strategies to analyze the modeled sentences.

Methodological Implications

Four methodological innovations incorporated in this study have special significance for social learning theory and for the practical application of modeling procedures.

The fact that twelve different individuals served as the models for this study negates the possibility that modeling effects may be due to some idiosyncrasy of the model used. This fact is particularly meaningful since the majority of modeling studies have utilized a single model and the legitimate criticism that all effects were due to some idiosyncratic characteristic of the model may be leveled. This study revealed that modeling procedures were effective even when using a relatively large number of different models. This procedural innovation implies that in an applied setting any of a number of potential models can be used with a degree of effectiveness.

A second innovation was the use of peers as models. The finding that the scores of subjects (with the important exception of the scores for the relative clause measure) exposed to peer models were nearly equal to those of subjects observing adult models suggests that peers may be effectively used as models displaying rule-governed behaviors for middle childhood age children. This fact should be of concern to teachers, including foreign language teachers, interested in increasing the linguistic performance of their students. However, the single exception noted above suggests that peer models may not always be as effective as adults. Possibly, with complex grammatical constructions, such as relative clauses, adult models may be more appropriate.

The small groupings of students used in this study indicate that modeling effects for rule-governed behaviors will occur in group situations similar to classroom settings. This finding replicates that one made by Rosenthal and Carroll (1972).

Finally, the fact the subjects were required to write their responses distinguished this study from other modeling studies. The results clearly demonstrated that the specified rules and behaviors could be orally modeled, transmitted and abstracted, and finally converted by the subjects into written form. The procedural innovation and consequent finding imply that the procedure could well be incorporated as a classroom technique for increasing the performance of rule-governed language behaviors.

All four implications received testimonial support in statements of two of the participating sixth-grade teachers, who stated that they were able to induce their students to imitate grammatical structures such as prepositional phrases, complex tense structures, etc. when they were so instructed, but that the students seldom used those same structures in a subsequent free session. This study indicated that modeling procedures alone were effective as means of inducing students to imitate grammatical structures and interpretive categories and, most significant, those same procedures were effective in leading those same students to continue to produce the specified structures (although in decreased quantity) in an immediately occurring generalization phase (free session).

Equally important was the finding that nearly equal modeling effects were achieved while using three different modes of modeling and models of two different age levels. The latter finding implies that the classroom teacher may be replaced (or complemented) by the tape recorder, by the written word, or by one of the students to produce results equal to what the teacher could achieve. Of course, these replacements have been used in the past. However, they have not been used as freely as they might when the teaching objective is related to the increased performance of rule-governed cognitive and language behaviors.

Implications for Further Study

The conduct of this study as well as the results suggest the route later studies might follow. It would be worthwhile to determine the magnitude of the modeling effect if students were able to respond orally while in a group setting rather than being required to write their responses. Further investigation of the role of the model age variable, alone and in interaction with other factors such as sex of the model and sex of the observer, is certainly indicated by this study. Many more studies of the relationship of modeling procedures and rule-governed language behaviors are needed; these studies need to be of both theoretical and applied value. One type of study should attempt to investigate the relationship of modeling and rule-governed behaviors in which non-pictorial stimuli are used. That is, a model might display rule-governed interpretive behaviors after reading a passage of prose or poetry in order to determine whether the subjects could observationally acquire a style or manner of interpretation.

The results of this study clearly indicated the modeling effect on rule-governed language behaviors. Confirmation of the fact that rules governing language behaviors can be abstracted by young students exposed to models was also indicated. However, the results did not add to the knowledge or confirm facts about the linguistic competence of the students while they did indicate that modeling procedures were effective in altering the linguistic performance of these students. In terms of the communicative competence, it appeared that the modeling procedures aided the students in the acquisition of new social rules related to the rule-governed language behaviors and their performance. Unfortunately, the role of the specified attentional variables was only partially determined, a fact which suggests that further study is required in this area.

APPENDIX A

TABLES 1 - 30

Table 1

Means and Standard Deviations: 52 Groups

	Valuational Category		Other Value		Combination Values		Relative Clause		Prepositional Phrase		Length	
Group	Imitation	Generalization	Imitation	Generalization	Imitation	Generalization	Imitation	Generalization	Imitation	Generalization	Imitation	Generalization
ContAnM												
Mean	.25	.25	.75	0	1	.25	0	0	4.25	3.25	73	75.75
S.D.	.5	.5	1.5	0	.2	.5	0	0	.5	.5	15.53	17.21
ContAnF												
Mean	0	0	0	.25	0	.25	0	0	4.5	4.5	92.75	89.50
S.D.	0	0	0	.5	0	.5	0	0	2.5	1.5	14.95	9.678
ContChM												
Mean	0	.25	.50	.25	.5	.5	0	0	3.25	2.75	83.25	70.25
S.D.	0	.5	1.0	.5	1.0	.578	0	0	2.5	.5	19.4	16.52
ContChF												
Mean	1.25	.5	0	0	1.25	.5	0	0	4	3.25	81.75	86.75
S.D.	2.5	1.0	0	0	2.5	1.0	0	0	2.8	2.07	16.5	8.27

Note.--L = Live mode
T = Taped mode
W = Written mode
Cont = Control
Ad = Adult model
P = Peer model
A = Anglo model
C = Chicano model
An = Anglo subject
Ch = Chicano subject
M = Male subject
F = Female subject

Table 1 (continued)

Group	Valuational Category		Other Value		Combination Values		Relative Clause		Prepositional Phrase		Length	
	Imitation	Generalization	Imitation	Generalization	Imitation	Generalization	Imitation	Generalization	Imitation	Generalization	Imitation	Generalization
LAdAAnM												
Mean	10.25	6.5	1.5	.25	11.75	6.75	4	2.25	5.25	4.25	131.75	129.25
S.D.	2.22	4.65	.58	.5	2.36	4.43	1.85	3.86	.96	1.71	8.18	15.78
LAdAAnF												
Mean	6.75	1.5	.5	1	7.25	2.5	[illegible]	.25	7.5	6.75	134.25	124.75
S.D.	3.69	1.73	.58	.8	4.11	1.67	[illegible]	.5	3.79	3.4	15.95	5.91
LAdAChM												
Mean	9.25	1.25	.5	0	9.75	1.25	1.75	.25	5.25	6.5	108.75	104.25
S.D.	2.36	1.26	.58	0	2.22	1.26	3.5	.5	.96	3.87	12.69	17.97
LAdAChF												
Mean	8.5	2.5	.25	.25	8.75	2.75	1.5	0	5.5	4.5	108.75	94.25
S.D.	3.0	2.38	.5	.5	2.75	2.36	1.73	0	2.38	2.38	12.84	9.54
LAdCAnM												
Mean	7.5	2.0	1.5	1.25	9	3.25	1.5	1.5	6.5	8	137.00	124.25
S.D.	2.39	1.83	1.29	1.26	2.16	2.63	1.29	1.73	1.91	2.94	31.73	23.88

Note.--L = Live mode
T = Taped mode
W = Written mode
Cont = Control
Ad = Adult model
P = Peer model
A = Anglo model
C = Chicano model
An = Anglo subject
Ch = Chicano subject
M = Male subject
F = Female subject

Table 1 (continued)

Group	Valuational Category		Other Value		Combination Values		Relative Clause		Prepositional Phrase		Length	
	Imitation	Generalization	Imitation	Generalization	Imitation	Generalization	Imitation	Generalization	Imitation	Generalization	Imitation	Generalization
LAdCAnF												
Mean	6.5	1.25	1.5	1	8	2.25	0	0	6	4.75	106	93
S.D.	1.29	1.89	.58	.816	1.63	1.89	0	0	1.15	1.89	23.3	22.14
LAdCChM												
Mean	6.75	2.5	.25	.75	7	3.25	2	.25	5.25	5.75	118.25	107.75
S.D.	3.86	.58	.5	.96	3.65	.96	1.73	.5	1.5	2.21	8.96	22.98
LAdCChF												
Mean	5.75	2	1.5	.25	7.25	2.25	3	.75	4	5.5	110.25	107.5
S.D.	4.92	2.83	4.14	.5	4.53	2.63	4.76	.96	1.41	3.70	26.36	31.98
LPAAnM												
Mean	5.5	1.75	1.75	2.25	7.25	4	2.5	.25	4	6.5	104.5	98
S.D.	1.91	1.26	.96	1.5	1.26	1.4	2.1	.5	2.16	3.5	31.85	45.1
LPAAnF												
Mean	9	1.5	.25	0	9.25	1.5	1	0	6.25	6.5	112	98.25
S.D.	2.9	.58	.5	0	3.20	.58	1.15	0	4.6	3.32	16.2	20.90

Note.--L = Live mode
T = Taped mode
W = Written mode
Cont = Control
Ad = Adult model
P = Peer model
A = Anglo model
C = Chicano model
An = Anglo subject
Ch = Chicano subject
M = Male subject
F = Female subject

Table 1 (continued)

	Valuational Category		Other Value		Combination Values		Relative Clause		Prepositional Phrase		Length	
Group	Imitation	Generalization	Imitation	Generalization	Imitation	Generalization	Imitation	Generalization	Imitation	Generalization	Imitation	Generalization
LPAChM												
Mean	5	1.5	1.25	1.25	6.25	2.75	.25	0	6.5	7.5	115.75	117
S.D.	2.94	1.73	1.89	1.5	1.26	2.36	.5	0	2.65	2.65	28.61	28.65
LPAChF												
Mean	7.0	1.75	1	.5	8	2.25	2	.5	4.5	6.5	112	109.5
S.D.	2.16	2.87	1.41	1.0	3.37	3.8	2.0	1.0	1.91	3.11	12.08	15.20
LPCAnM												
Mean	7.75	2.75	2	.25	9.75	3	.5	0	5	4.25	110.75	87
S.D.	2.87	2.63	1.83	.5	3.69	2.94	.58	0	3.46	2.63	29.28	11.40
LPCAnF												
Mean	6.5	1.25	.5	.75	7	2	1.25	0	7.5	6.25	122.5	104.25
S.D.	3.87	1.5	.58	.96	3.92	2.45	1.89	0	3.42	2.75	35.63	27.02
LPCChM												
Mean	5.0	7	.5	0	5.50	7	.2	0	4.25	3.5	95	82
S.D.	3.16	1.75	.58	0	2.65	1.75	3.37	0	1.5	1.29	13.74	11.34

Note.--L = Live mode Ad = Adult model A = Anglo model An = Anglo subject M = Male subject
T = Taped mode P = Peer model C = Chicano model Ch = Chicano subject F = Female subject
W = Written mode
Cont = Control

Table 1 (continued)

Group	Valuational Category		Other Value		Combination Values		Relative Clause		Prepositional Phrase		Length	
	Imitation	Generalization	Imitation	Generalization	Imitation	Generalization	Imitation	Generalization	Imitation	Generalization	Imitation	Generalization
LPCChF												
Mean	5.0	50	1.5	.75	6.5	1.25	.25	0	5.75	3.5	118	107
S.D.	2.94	.58	1.0	.96	2.9	1.5	.5	0	.96	2.08	14.5	22.9
TAdAAnM												
Mean	7.25	1.25	2.75	1.0	10.0	2.25	4.5	0	5.0	6.5	126.75	126.75
S.D.	3.25	1.25	1.6	1.0	3.2	2.63	1.8	0	2.8	2.6	18.6	18.6
TAdAAnF												
Mean	6.75	2	2.5	1.5	9.25	3.5	3	.5	5.75	6.5	119	111
S.D.	3.40	1.6	1.91	1.9	4.19	2.5	2.45	.58	2.36	3.0	63.8	22.4
TAdAChM												
Mean	4.5	2.25	1.25	.50	5.75	2.75	1.5	0	4.5	4.75	110	95.25
S.D.	3.7	2.9	.96	.58	4.2	3.1	2.4	0	2.4	3.4	18.5	14.2
TAdAChF												
Mean	6.25	1.5	2.25	1.25	8.5	2.75	.50	0	6.75	5.5	116.75	107.25
S.D.	1.7	2.4	2.6	2.5	1.3	4.9	.58	0	2.1	2.6	14.7	6.2

Note.--L = Live mode Ad = Adult model A = Anglo model An = Anglo subject M = Male subject
T = Taped mode P = Peer model C = Chicano model Ch = Chicano subject F = Female subject
W = Written mode
Cont = Control

Table 1 (continued)

Group	Valuational Category		Other Value		Combination Values		Relative Clause		Prepositional Phrase		Length	
	Imitation	Generalization	Imitation	Generalization	Imitation	Generalization	Imitation	Generalization	Imitation	Generalization	Imitation	Generalization
TAdCAnM												
Mean	8.5	2.75	.25	.25	8.75	3.0	.75	0	4.5	4.5	116	107
S.D.	3.0	2.06	.5	.5	2.6	2.5	.5	0	3.3	1.7	27.4	19.6
TAdCAnF												
Mean	4.5	.5	.5	.5	5	1	1.5	.5	4.75	6.5	98.25	96
S.D.	1.9	.58	.58	1.00	1.4	1.4	3.0	1.0	1.9	1.9	20.3	30.7
TAdCChM												
Mean	8.25	.75	.25	0	8.5	.75	0	0	3.5	4.5	92.5	85.5
S.D.	2.9	1.5	.5	0	3.3	1.5	0	0	1.7	2.4	22.6	12.9
TAdCChF												
Mean	5.5	2.25	1	.25	6.5	2.50	.5	.5	7.75	7.0	120	115.25
S.D.	3.3	3.8	1.15	.5	4.2	3.7	.58	.58	2.1	3.6	12.7	30.4
TPAAnM												
Mean	7.5	1.0	0	.25	7.5	1.25	.75	0	6.5	5.75	130.25	111.75
S.D.	3.7	2.0	0	.5	3.7	1.9	.96	0	1.9	.96	22.7	3.3

Note.--L = Live mode
T = Taped mode
W = Written mode
Cont = Control
Ad = Adult model
P = Peer model
A = Anglo model
C = Chicano model
An = Anglo subject
Ch = Chicano subject
M = Male subject
F = Female subject

Table 1 (continued)

Group	Valuational Category		Other Value		Combination Values		Relative Clause		Prepositional Phrase		Length	
	Imitation	Generalization	Imitation	Generalization	Imitation	Generalization	Imitation	Generalization	Imitation	Generalization	Imitation	Generalization
TPAAnF												
Mean	7.75	1.5	.75	.25	8.5	1.75	2	.25	8	6.75	141	125
S.D.	4.03	1.3	1.5	.5	4.8	.96	1.63	.5	5.4	1.7	10.23	6.8
TPAChM												
Mean	4.75	1.25	.25	0	5	1.25	0	.25	7.25	5.75	109	98
S.D.	5.12	2.5	.5	0	4.8	2.5	0	.5	4.2	2.98	26.4	16.4
TPAChF												
Mean	7.75	3.75	1	0	8.75	3.75	1.25	.5	4.75	7.25	137	130.25
S.D.	4.5	6.23	2.0	0	6.4	6.23	1.3	.58	.96	1.5	37.1	32.9
TPCAnM												
Mean	3.75	0.5	1.00	0	4.75	.5	.5	0	7.75	9	115.25	112
S.D.	1.7	1.0	2.00	0	2.75	1.0	1.0	0	7.4	6.8	49.6	45.7
TPCAnF												
Mean	8.75	3.5	.75	0	9.5	3.5	.5	.25	5	7.5	124.5	127.75
S.D.	3.2	4.5	.96	0	4.04	4.5	.58	.5	.82	2.4	36.8	46.9

Note.--L = Live mode   Ad = Adult model   A = Anglo model   An = Anglo subject   M = Male subject
T = Taped mode   P = Peer model   C = Chicano model   Ch = Chicano subject   F = Female subject
W = Written mode
Cont = Control

Table 1 (continued)

Group	Valuational Category		Other Value		Combination Values		Relative Clause		Prepositional Phrase		Length	
	Imitation	Generalization	Imitation	Generalization	Imitation	Generalization	Imitation	Generalization	Imitation	Generalization	Imitation	Generalization
TPCChM												
Mean	7.25	2.0	1.5	0	8.75	2.0	2.5	.50	3.75	5.25	126.75	129.25
S.D.	3.8	2.8	1.3	0	2.63	2.78	3.8	1.0	2.5	3.4	39.25	55.4
TPCChF												
Mean	8.5	2.0	1.75	0	10.25	2.0	.25	0	4.0	5.0	110.25	112.25
S.D.	4.7	.82	1.3	0	3.6	.82	.5	0	2.4	3.27	28.8	25.2
WAdAAnM												
Mean	3.75	.75	[illegible]	.25	4.75	1.0	.5	0	5	4.5	94.75	87.25
S.D.	5.2	.96	[illegible]	.5	5.2	1.4	1.0	0	2.4	2.4	11.3	16.2
WAdAAnF												
Mean	3.5	.75	1.75	1	5.25	1.75	.75	0	8.5	7.0	128.75	129.75
S.D.	2.9	1.5	2.1	.82	3.8	2.2	.5	0	3.9	2.2	55.9	54.9
WAdAChM												
Mean	2.5	0.25	1.75	.25	4.25	.50	.5	0	5.75	6.25	104	101.75
S.D.	2.4	.5	2.9	.5	4.3	.58	.58	0	2.1	2.5	14.4	3.1

Note.--L = Live mode   Ad = Adult model   A = Anglo model   An = Anglo subject   M = Male subject
T = Taped mode   P = Peer model   C = Chicano model   Ch = Chicano subject   F = Female subject
W = Written mode
Cont = Control

Table 1 (continued)

Group	Valuational Category Imitation	Valuational Category Generalization	Other Value Imitation	Other Value Generalization	Combination Values Imitation	Combination Values Generalization	Relative Clause Imitation	Relative Clause Generalization	Prepositional Phrase Imitation	Prepositional Phrase Generalization	Length Imitation	Length Generalization
WAdAChF												
Mean	3.75	.25	.75	0	4.5	.25	.25	.25	2.75	5.75	86.5	95.75
S.D.	2.99	.5	.5	0	3.1	.5	.5	.5	1.7	1.3	3.0	7.5
WAdCAnM												
Mean	6.5	2.0	1.25	1	7.75	3.0	3	4.25	6	10.25	120	135
S.D.	2.4	1.8	1.3	.82	1.5	2.2	5.35	5.96	5.29	1.7	20.8	18.7
WAdCAnF												
Mean	5.0	1.0	1.75	.75	6.75	1.75	1.5	.25	7.25	8	118.75	126.25
S.D.	2.8	0	.96	.96	2.98	.96	3.0	.5	2.2	3.9	34.1	27.3
WAdCChM												
Mean	4.25	1.5	1.75	1.25	6.0	2.75	1	1.25	6.5	9.25	119	119.25
S.D.	2.98	2.4	2.1	1.5	2.4	3.8	1.4	.5	1.7	2.2	21.8	20.2
WAdCChF												
Mean	5.25	1.25	1.5	1	6.75	2.25	3.75	.75	7.25	8.75	124.25	131
S.D.	2.6	2.5	1.0	.82	3.3	2.6	4.5	.96	3.8	4.6	30.5	34.7

Note.—L = Live mode
T = Taped mode
W = Written mode
Cont = Control
Ad = Adult model
P = Peer model
A = Anglo model
C = Chicano model
An = Anglo subject
Ch = Chicano subject
M = Male subject
F = Female subject

Table 1 (continued)

Group	Valuational Category		Other Value		Combination Values		Relative Clause		Prepositional Phrase		Length	
	Imitation	Generalization	Imitation	Generalization	Imitation	Generalization	Imitation	Generalization	Imitation	Generalization	Imitation	Generalization
WPAAnM												
Mean	3.25	.25	.50	.25	3.75	.50	.25	1	7.75	6.5	136.5	114.75
S.D.	1.7	.5	.58	.5	2.1	1.0	.5	1.4	6.9	4.4	63.6	54.8
WPAAnF												
Mean	3.75	1.25	2.0	1.5	5.75	2.75	.25	.25	7.25	7	115.75	109.5
S.D.	2.9	1.5	2.2	1.3	3.4	2.5	.5	.5	4.6	3.7	20.8	16.9
WPAChM												
Mean	5.25	1.0	1	0	6.25	1	1	.25	6.5	5.25	118.5	96.75
S.D.	3.8	.82	1.4	0	4.3	.82	1.4	.5	5.7	5.1	51.2	27.7
WPAChF												
Mean	7.25	2.25	1.5	1	8.75	3.25	1	0	7.75	5.75	124.25	110.5
S.D.	4.03	1.7	3.0	2.0	5.7	2.98	.82	0	1.25	1.5	21.7	20.9
WPCAnM												
Mean	2.0	.25	1.75	.75	3.75	1	1	0	6.5	3.75	104	91.25
S.D.	1.8	.5	2.1	1.5	2.6	2.0	2.0	0	2.5	3.8	20.6	17.13

Note.--L = Live mode   Ad = Adult model   A = Anglo model   An = Anglo subject   M = Male subject
T = Taped mode   P = Peer model   C = Chicano model   Ch = Chicano subject   F = Female subject
W = Written mode
Cont = Control

Table 1 (continued)

Group	Valuational Category		Other Value		Combination Values		Relative Clause		Prepositional Phrase		Length	
	Imitation	Generalization	Imitation	Generalization	Imitation	Generalization	Imitation	Generalization	Imitation	Generalization	Imitation	Generalization
WPCAnF												
Mean	7.25	3.25	1	.75	8.25	4.0	.75	.5	5.5	6.5	119.75	126.5
S.D.	4.6	1.2	1.4	.5	3.5	2.6	.96	1.0	3.1	4.4	27.2	32.3
WPCChM												
Mean	5	.5	1.25	0	6.25	.5	1.5	.5	6.75	4.75	105.75	94
S.D.	2.2	1.0	1.3	0	1.3	1.0	1.7	1.0	3.3	.96	17.6	20.9
WPCChF												
Mean	1.5	.25	1.5	0	3	.25	.25	0	4.0	6.5	95.75	113.5
S.D.	1.3	.5	2.4	0	2.9	.5	.5	0	2.2	3.0	30.01	33.01

Note.--L = Live mode
T = Taped mode
W = Written mode
Cont = Control
Ad = Adult model
P = Peer model
A = Anglo model
C = Chicano model
An = Anglo subject
Ch = Chicano subject
M = Male subject
F = Female subject

Table 2

One-Way Analysis of Variance for Control Group:
Prepositional Phrases--Imitation Phase

Source	df	MS	F
Ethnicity	1	2.25	0.432
Sex	1	1.00	0.192
Ethnicity x Sex	1	0.25	0.048
Within	12	5.208	

Table 3

One-Way Analysis of Variance for Control Group:
Length--Imitation Phase

Source	df	MS	F
Ethnicity	1	0.565	0.002
Sex	1	333.063	1.196
Ethnicity x Sex	1	451.063	1.622
Within	12	278.521	

Table 4

One-Way Analysis of Variance for Control Group:
Prepositional Phrases--Generalization Phase

Source	df	MS	F
Ethnicity	1	3.0625	1.909
Sex	1	3.0625	1.909
Ethnicity x Sex	1	0.5625	0.351
Within	12	1.6042	

Table 5

One-Way Analysis of Variance for Control Group:
Length--Generalization Phase

Source	df	MS	F
Ethnicity	1	68.0625	0.372
Sex	1	915.0625	5.007*
Ethnicity x Sex	1	7.6	0.042
Within	12	182.771	

*$p < .05$

Table 6

One-Way Analysis of Variance for 13 Groups:
Valuational Category--Imitation Phase

Source	df	MS	F
Total	207		7.222*
Between	12	70.621	
Within	195	9.779	

*$p < .001$

Table 7

One-Way Analysis of Variance for 13 Groups:
Other Value--Imitation Phase

Source	df	MS	F
Total	207		2.145*
Between	12	4.110	
Within	195	1.916	

*$p < .025$

Table 8

One-Way Analysis of Variance for 13 Groups:
Combination Values--Imitation Phase

Source	df	MS	F
Total	207		6.708*
Between	12	77.682	
Within	195	11.580	

*$p < .001$

Table 9

One-Way Analysis of Variance for 13 Groups:
Relative Clause--Imitation Phase

Source	df	MS	F
Total	207		2.259*
Between	12	8.811	
Within	195	3.901	

*$p < .01$

Table 10

One-Way Analysis of Variance for 13 Groups:
Prepositional Phrase--Imitation Phase

Source	df	MS	F
Total	207		1.240
Between	12	11.255	
Within	195	9.077	

Table 11

One-Way Analysis of Variance for 13 Groups:
Length--Imitation Phase

Source	df	MS	F
Total	207		3.323*
Between	12	2249.698	
Within	195	676.827	

*$p < .001$

Table 12

One-Way Analysis of Variance for 13 Groups:
Valuational Category--Generalization Phase

Source	df	MS	F
Total	207		1.74*
Between	12	7.667	
Within	195	4.413	

*$p < .05$

Table 13

One-Way Analysis of Variance for 13 Groups:
Other Value--Generalization Phase

Source	df	MS	F
Total	207		2.715*
Between	12	2.123	
Within	195	0.782	

*$p < .01$

Table 14

One-Way Analysis of Variance for 13 Groups:
Combination Values--Generalization Phase

Source	df	MS	F
Total	207		1.799*
Between	12	10.391	
Within	195	5.775	

*$p < .05$

Table 15

One-Way Analysis of Variance for 13 Groups:
Relative Clause--Generalization Phase

Source	df	MS	F
Total	207		2.26*
Between	12	3.035	
Within	195	1.340	

*$p < .01$

Table 16

One-Way Analysis of Variance for 13 Groups:
Prepositional Phrases--Generalization Phase

Source	df	MS	F
Total	207		3.404*
Between	12	27.377	
Within	195	8.042	

*$p < .001$

Table 17

One-Way Analysis of Variance for 13 Groups:
Length--Generalization Phase

Source	df	MS	F
Total	207		3.362*
Between	12	2179.20	
Within	195	648.231	

*$p < .001$

Table 18

Multiple Classification Analysis of Variance:
Valuational Category--Imitation Phase

Source of Variation	Degrees of Freedom	MS	F
M	2	134.59834	12.958*
A	1	2.29685	<1
E	1	1.50520	<1
R	1	7.92185	<1
S	1	3.79688	<1
MxA	2	15.23518	1.466
MxE	2	15.56839	1.499
MxR	2	3.57892	<1
MxS	2	3.42256	<1
AxE	1	3.79691	<1
AxR	1	0.63026	<1
AxS	1	71.29688	6.864**
ExR	1	0.88024	<1
ExS	1	11.50522	1.108
RxS	1	0.25523	<1
MxAxE	2	18.70256	1.801
MxAxR	2	9.44219	<1
MxAxS	2	8.01507	1
MxExR	2	24.75468	2.382
MxExS	2	0.53595	<1
MxRxS	2	2.75470	<1
AxExR	1	1.88018	<1
AxExS	1	0.63020	<1
AxRxS	1	29.29684	2.820
ExRxS	1	23.38017	2.251
MxAxExR	2	6.16215	<1
MxAxExS	2	25.00589	2.407
MxAxRxS	2	4.82889	<1
MxExRxS	2	6.03715	<1
AxExRxS	1	10.54693	1.015
MxAxExRxS	2	18.09937	1.742
Within Replicates	144	10.38715	
Total	191		

*$p < .001$

**$p < .05$

Note.--M = Mode; A = Model Age; E = Model Ethnicity; R = Subject Ethnicity; S = Subject Sex

Table 19

Multiple Classification Analysis of Variance:
Other Value--Imitation Phase

Source of Variation	Degrees of Freedom	MS	F
M	2	2.22396	<1
A	1	1.02083	<1
E	1	0.00000	<1
R	1	0.33333	<1
S	1	0.52083	<1
MxA	2	1.56771	<1
MxE	2	2.67187	1.200
MxR	2	0.84896	<1
MxS	2	1.97396	<1
AxE	1	4.68750	2.106
AxR	1	2.52083	1.132
AxS	1	0.08333	<1
ExR	1	0.75000	<1
ExS	1	0.02083	<1
RxS	1	2.52083	1.135
MxAxE	2	9.95313	4.472*
MxAxR	2	0.69271	<1
MxAxS	2	0.88021	<1
MxExR	2	1.04688	<1
MxExS	2	2.44271	1.097
MxRxS	2	4.28646	1.926
AxExR	1	0.52083	<1
AxExS	1	3.00000	1.348
AxRxS	1	0.75000	<1
ExRxS	1	1.68750	<1
MxAxExR	2	0.03647	<1
MxAxExS	2	0.20314	<1
MxAxRxS	2	0.98440	<1
MxExRxS	2	0.67189	<1
AxExRxS	1	0.75001	<1
MxAxExRxS	2	0.01321	<1
Within Replicates	144	2.22569	
Total	191		

*$p < .01$

Note.--M = Mode; A = Model Age; E = Model Ethnicity; R = Subject Ethnicity; S = Subject Sex

Table 20

Multiple Classification Analysis of Variance: Combination Values--Imitation Phase

Source of Variation	Degrees of Freedom	MS	F
M	2	102.64563	8.236*
A	1	6.38017	<1
E	1	1.50520	<1
R	1	11.50512	<1
S	1	7.13021	<1
MxA	2	7.58355	<1
MxE	2	11.39604	<1
MxR	2	7.58358	<1
MxS	2	10.14604	<1
AxE	1	0.04692	<1
AxR	1	5.67200	<1
AxS	1	66.50523	5.336**
ExR	1	0.00531	<1
ExS	1	10.54688	<1
RxS	1	4.38031	<1
MxAxE	2	27.99977	2.247
MxAxR	2	7.93731	<1
MxAxS	2	5.89569	<1
MxExR	2	34.33318	2.755
MxExS	2	1.93730	<1
MxRxS	2	13.27069	1.065
AxExR	1	4.38010	<1
AxExS	1	0.88017	<1
AxRxS	1	20.67175	1.659
ExRxS	1	12.50513	1.003
MxAxExR	2	5.39638	<1
MxAxExS	2	24.02127	1.927
MxAxRxS	2	3.56303	<1
MxExRxS	2	6.52128	<1
AxExRxS	1	5.67200	<1
MxAxExRxS	2	17.42773	1.398
Within Replicates	144	12.46354	
Total	191		

*$p < .001$

**$p < .01$

Note.--M = Mode; A = Model Age; E = Model Ethnicity; R = Subject Ethnicity; S = Subject Sex

Table 21

Multiple Classification Analysis of Variance: Relative Clause--Imitation Phase

Source of Variation	Degrees of Freedom	MS	F
M	2	3.85938	<1
A	1	19.38020	4.529*
E	1	0.63021	<1
R	1	2.29688	<1
S	1	2.29688	<1
MxA	2	0.06771	<1
MxE	2	16.31770	3.813**
MxR	2	5.20313	1.216
MxS	2	0.98438	<1
AxE	1	0.04689	<1
AxR	1	4.38021	1.024
AxS	1	0.13021	<1
ExR	1	15.75521	3.68
ExS	1	0.00521	<1
RxS	1	3.25521	<1
MxAxE	2	10.17188	2.377
MxAxR	2	5.72396	1.338
MxAxS	2	1.94271	<1
MxExR	2	5.34896	1.250
MxExS	2	0.25521	<1
MxRxS	2	3.59896	<1
AxExR	1	3.79690	<1
AxExS	1	18.13022	4.237**
AxRxS	1	10.54690	2.465
ExRxS	1	1.88023	<1
MxAxExR	2	0.76562	<1
MxAxExS	2	2.44270	<1
MxAxRxS	2	0.32812	<1
MxExRxS	2	5.72395	1.338
AxExRxS	1	14.63019	3.419
MxAxExRxS	2	1.59897	<1
Within Replicates	144	4.27951	
Total	191		

*$p < .001$

**$p < .05$

Note.--M = Mode; A = Model Age; E = Model Ethnicity; R = Subject Ethnicity; S = Subject Sex

Table 22

Multiple Classification Analysis of Variance: Prepositional Phrases--Imitation Phase

Source of Variation	Degrees of Freedom	MS	F
M	2	11.52083	1.165
A	1	3.00000	<1
E	1	7.52083	1
R	1	28.52083	2.885
S	1	6.02083	<1
MxA	2	2.43750	<1
MxE	2	3.58334	<1
MxR	2	0.27084	<1
MxS	2	2.14584	<1
AxE	1	14.08333	1.424
AxR	1	1.33333	<1
AxS	1	14.08334	1.424
ExR	1	0.02083	<1
ExS	1	1.02084	<1
RxS	1	9.18750	<1
MxAxE	2	13.14583	1.330
MxAxR	2	14.14584	1.431
MxAxS	2	13.39583	1.355
MxExR	2	5.77083	<1
MxExS	2	0.64584	<1
MxRxS	2	12.06251	1.220
AxExR	1	12.00000	1.214
AxExS	1	0.08335	<1
AxRxS	1	0.33334	<1
ExRxS	1	22.68753	2.295
MxAxExR	2	1.00002	<1
MxAxExS	2	13.58335	1.374
MxAxRxS	2	12.02085	1.216
MxExRxS	2	3.24999	<1
AxExRxS	1	0.75002	<1
MxAxExRxS	2	13.92944	1.409
Within Replicates	144	9.88542	
Total	191		

Note.--M = Mode; A = Model Age; E = Model Ethnicity; R = Subject Ethnicity; S = Subject Sex

Table 23

Multiple Classification Analysis of Variance:
Length--Imitation Phase

Source of Variation	Degrees of Freedom	MS	F
M	2	377.69263	<1
A	1	247.52078	<1
E	1	800.33325	1.057
R	1	2730.08252	3.605
S	1	238.52078	<1
MxA	2	1591.97314	2.102
MxE	2	542.59888	<1
MxR	2	33.78679	<1
MxS	2	99.56775	<1
AxE	1	1170.18726	1.545
AxR	1	157.68750	<1
AxS	1	385.33325	<1
ExR	1	374.08350	<1
ExS	1	117.18756	<1
RxS	1	63.02042	<1
MxAxE	2	1814.73901	2.400
MxAxR	2	293.54956	<1
MxAxS	2	685.78979	<1
MxExR	2	87.82115	<1
MxExS	2	119.01570	<1
MxRxS	2	594.09888	<1
AxExR	1	1017.52563	1.344
AxExS	1	200.08344	<1
AxRxS	1	154.08466	<1
ExRxS	1	143.52319	<1
MxAxExR	2	346.59570	<1
MxAxExS	2	1097.75562	1.450
MxAxRxS	2	819.38232	<1
MxExRxS	2	239.13492	<1
AxExRxS	1	2914.08765	3.848
MxAxExRxS	2	742.23438	<1
Within Replicates	144	757.21509	
Total	191		

Note.--M = Mode; A = Model Age; E = Model Ethnicity; R = Subject Ethnicity; S = Subject Sex

Table 24

Multiple Classification Analysis of Variance: Valuational Category--Generalization Phase

Source of Variation	Degrees of Freedom	MS	F
M	2	16.52083	3.505*
A	1	0.88021	<1
E	1	0.13021	<1
R	1	1.50521	<1
S	1	0.13021	<1
MxA	2	6.08334	1.291
MxE	2	3.52084	<1
MxR	2	3.64584	<1
MxS	2	12.64583	2.683
AxE	1	0.04688	<1
AxR	1	1.17188	<1
AxS	1	19.38020	4.112*
ExR	1	0.88021	<1
ExS	1	0.25521	<1
RxS	1	3.25521	<1
MxAxE	2	4.18750	<1
MxAxR	2	0.25000	<1
MxAxS	2	1.52083	<1
MxExR	2	4.39583	<1
MxExS	2	0.02084	<1
MxRxS	2	5.77084	1.224
AxExR	1	16.92186	3.590
AxExS	1	0.63022	<1
AxRxS	1	13.54688	2.874
ExRxS	1	6.38021	1.354
MxAxExR	2	1.93753	<1
MxAxExS	2	3.58335	<1
MxAxRxS	2	0.43750	<1
MxExRxS	2	2.64585	<1
AxExRxS	1	6.38025	1.354
MxAxExRxS	2	16.32495	3.462*
Within Replicates	144	4.71354	
Total	191		

*$p < .05$

Note.--M = Mode; A = Model Age; E = Model Ethnicity; R = Subject Ethnicity; S = Subject Sex

Table 25

Multiple Classification Analysis of Variance:
Other Value--Generalization Phase

Source of Variation	Degrees of Freedom	MS	F
M	2	1.63021	1.965
A	1	2.08333	2.510
E	1	0.75000	<1
R	1	4.68748	5.649*
S	1	0.52083	<1
MxA	2	2.09895	2.529
MxE	2	1.60937	1.939
MxR	2	0.10938	<1
MxS	2	1.03646	1.249
AxE	1	2.08333	2.511
AxR	1	0.02084	<1
AxS	1	0.18750	<1
ExR	1	0.18751	<1
ExS	1	0.18750	<1
RxS	1	0.00000	<1
MxAxE	2	3.66146	4.412**
MxAxR	2	0.72395	<1
MxAxS	2	1.42187	1.713
MxExR	2	0.04687	<1
MxExS	2	2.07813	2.504
MxRxS	2	0.32813	<1
AxExR	1	0.18750	<1
AxExS	1	2.52083	3.038
AxRxS	1	0.75000	<1
ExRxS	1	0.00001	<1
MxAxExR	2	0.57815	<1
MxAxExS	2	3.50523	4.224**
MxAxRxS	2	0.48439	<1
MxExRxS	2	0.32813	<1
AxExRxS	1	0.33332	<1
MxAxExRxS	2	0.19218	<1
Within Replicates	144	0.82986	
Total	191		

*$p < .01$

**$p < .05$

Note.--M = Mode; A = Model Age; E = Model Ethnicity; R = Subject Ethnicity; S = Subject Sex

Table 26

Multiple Classification Analysis of Variance: Combination Value--Generalization Phase

Source of Variation	Degrees of Freedom	MS	F
M	2	16.50520	2.614
A	1	5.67187	<1
E	1	1.50521	<1
R	1	11.50521	1.122
S	1	1.17188	<1
MxA	2	2.07813	<1
MxE	2	6.59896	1.045
MxR	2	5.00521	<1
MxS	2	20.73438	3.284*
AxE	1	1.50521	<1
AxR	1	1.50523	1
AxS	1	15.75521	2.495
ExR	1	0.25521	<1
ExS	1	0.88021	<1
RxS	1	3.25521	<1
MxAxE	2	9.25521	1.466
MxAxR	2	1.59896	<1
MxAxS	2	4.28646	<1
MxExR	2	3.53646	<1
MxExS	2	2.47396	<1
MxRxS	1	8.69271	1.377
AxExR	1	20.67188	3.274
AxExS	1	0.63022	<1
AxRxS	1	7.92189	1.255
ExRxS	1	6.38022	1.010
MxAxExR	2	2.67188	<1
MxAxExS	2	0.06772	<1
MxAxRxS	2	0.01563	<1
MxExRxS	2	3.66146	<1
AxExRxS	1	9.63023	1.525
MxAxExRxS	2	13.06177	2.069
Within Replicates	144	6.31424	
Total	191		

*$p < .05$

Note.--M = Mode; A = Model Age; E = Model Ethnicity; R = Subject Ethnicity; S = Subject Sex

Table 27

Multiple Classification Analysis of Variance:
Relative Clause--Generalization Phase

Source of Variation	Degrees of Freedom	MS	F
M	2	2.25520	1.632
A	1	6.02081	4.357*
E	1	2.08333	1.508
R	1	2.52082	1.824
S	1	3.52082	2.548
MxA	2	1.78647	1.293
MxE	2	3.22395	2.333
MxR	2	0.84896	<1
MxS	2	3.19271	2.310
AxE	1	5.33334	3.859*
AxR	1	2.52084	1.824
AxS	1	2.52084	1.824
ExR	1	0.00001	<1
ExS	1	0.75001	<1
RxS	1	3.52083	2.548
MxAxE	2	3.13021	2.265
MxAxR	2	0.25522	<1
MxAxS	2	1.78647	1.293
MxExR	2	0.67189	<1
MxExS	2	1.51564	1.097
MxRxS	2	2.28647	1.655
AxExR	1	0.08335	<1
AxExS	1	0.75003	<1
AxRxS	1	4.68752	3.392
ExRxS	1	0.08334	<1
MxAxExR	2	2.28645	1.655
MxAxExS	2	4.23436	3.064*
MxAxRxS	2	1.04687	<1
MxExRxS	2	0.38022	<1
AxExRxS	1	4.08332	2.955
MxAxExRxS	2	1.09413	<1
Within Replicates	144	1.38194	
Total	191		

*$p < .05$

Note.--M = Mode; A = Model Age; E = Model Ethnicity; R = Subject Ethnicity; S = Subject Sex

Table 28

Multiple Classification Analysis of Variance: Prepositional Phrases--Generalization Phase

Source of Variation	Degrees of Freedom	MS	F
M	2	14.53646	1.560
A	1	6.38021	<1
E	1	0.63021	<1
R	1	14.63021	1.570
S	1	6.38021	<1
MxA	2	26.00520	2.791
MxE	2	18.63020	1.999
MxR	2	2.88021	<1
MxS	2	4.63021	<1
AxE	1	53.13020	5.702*
AxR	1	3.25522	<1
AxS	1	2.75521	<1
ExR	1	3.79687	<1
ExS	1	0.63021	<1
RxS	1	1.17188	<1
MxAxE	2	21.47395	2.304
MxAxR	2	0.41146	<1
MxAxS	2	8.03646	<1
MxExR	2	5.07814	<1
MxExS	2	0.03646	<1
MxRxS	2	3.70313	<1
AxExR	1	6.38023	<1
AxExS	1	4.38022	<1
AxRxS	1	0.04689	<1
ExRxS	1	9.63024	1.034
MxAxExR	2	12.69278	1.362
MxAxExS	2	20.44292	2.194
MxAxRxS	2	0.29688	<1
MxExRxS	2	2.25520	<1
AxExRxS	1	14.63019	1.570
MxAxExRxS	2	5.96606	<1
Within Replicates	144	9.31771	
Total	191		

*$p < .01$

Note.--M = Mode; A = Model Age; E = Model Ethnicity; R = Subject Ethnicity; S = Subject Sex

Table 29

Multiple Classification Analysis of Variance:
Length--Generalization Phase

Source of Variation	Degrees of Freedom	MS	F
M	2	666.85938	<1
A	1	73.75520	<1
E	1	61.88020	<1
R	1	1050.00513	1.477
S	1	2415.42188	3.398
MxA	2	3248.04888	4.569*
MxE	2	1486.91138	2.091
MxR	2	78.78650	<1
MxS	2	897.39063	1.262
AxE	1	709.17188	<1
AxR	1	837.50537	1.178
AxS	1	1097.29688	1.543
ExR	1	302.50537	<1
ExS	1	0.25529	<1
RxS	1	109.50528	<1
MxAxE	2	1181.54883	1.662
MxAxR	2	512.88281	<1
MxAxS	2	354.48438	<1
MxExR	2	4.94531	<1
MxExS	2	388.75586	<1
MxRxS	2	260.63281	<1
AxExR	1	693.88013	<1
AxExS	1	772.00903	1.086
AxRxS	1	273.13135	<1
ExRxS	1	371.29688	<1
MxAxExR	2	579.47266	<1
MxAxExS	2	1274.28516	1.792
MxAxRxS	2	562.91211	<1
MxExRxS	2	346.51563	<1
AxExRxS	1	3631.38916	5.108*
MxAxExRxS	2	465.77539	<1
Within Replicates	144	710.93555	
Total	191		

*$p < .05$

Note.--M = Mode; A = Model Age; E = Model Ethnicity; R = Subject Ethnicity; S = Subject Sex

Table 30

Summary of Main Effects and Interaction Effects

Measure:	Valuational Category		Other Value		Combination Values		Relative Clause		Prepositional Phrase		Length	
Phase:	Imitation	Generalization	Imitation	Generalization	Imitation	Generalization	Imitation	Generalization	Imitation	Generalization	Imitation	Generalization
Effect:												
Modeling	X		X		X	X	X			X	X	X
Mode	L = T L > W T > W		L = T L > W T > W		L = T L > W T > W							
M Age							Ad > P	Ad > P				
M Ethnicity												
S Ethnicity				A > C								
S Sex												Cont. F > M

Note.--L = Live A = Anglo Ad = Adult M = Male
T = Taped C = Chicano P = Peer F = Female
W = Written

Table 30 (continued)

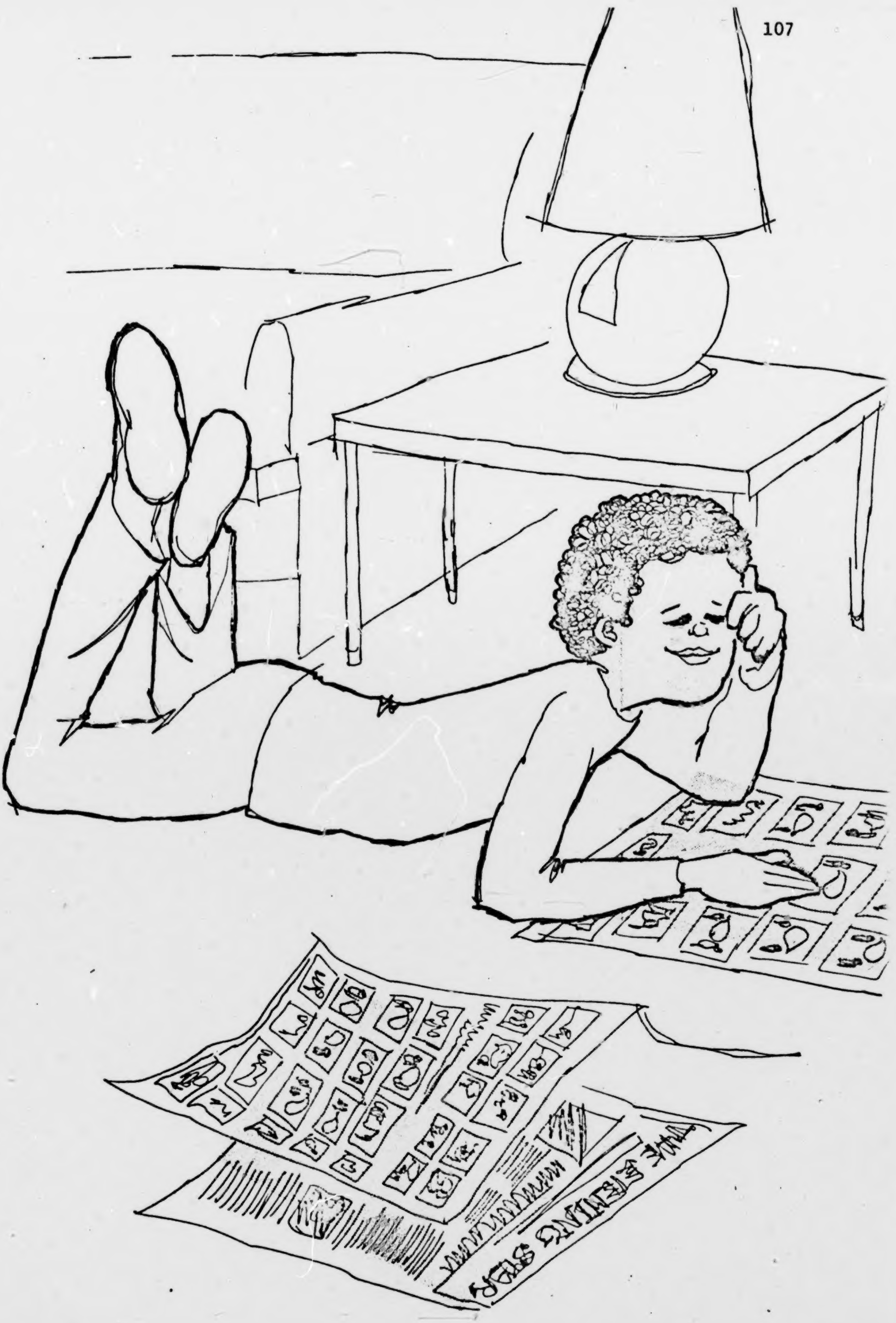
Measure:	Valuational Category		Other Value		Combination Values		Relative Clause		Prepositional Phrase		Length	
Phase	Imitation	Generalization	Imitation	Generalization	Imitation	Generalization	Imitation	Generalization	Imitation	Generalization	Imitation	Generalization
Mode x M Age												LAd > LP WAd > WP TAd < TP
Mode x M Ethnicity							LA > LC TA > TC WA < WC					
Mode x S Sex						ML > FL FT > MT FW > MW						
M Age x M Ethnicity								AAd < CAd AP > CP		AAd < CAd AP > CP		
M Age x S Sex	MAd > FAd FP > MP	MAd > FAd FP > MP			MAd > FAd FP > MP							

Note.--L = Live A = Anglo Ad = Adult M = Male
T = Taped C = Chicano P = Peer F = Female
W = Written

APPENDIX B

STIMULUS MATERIALS

IMITATION PHASE STIMULUS PICTURES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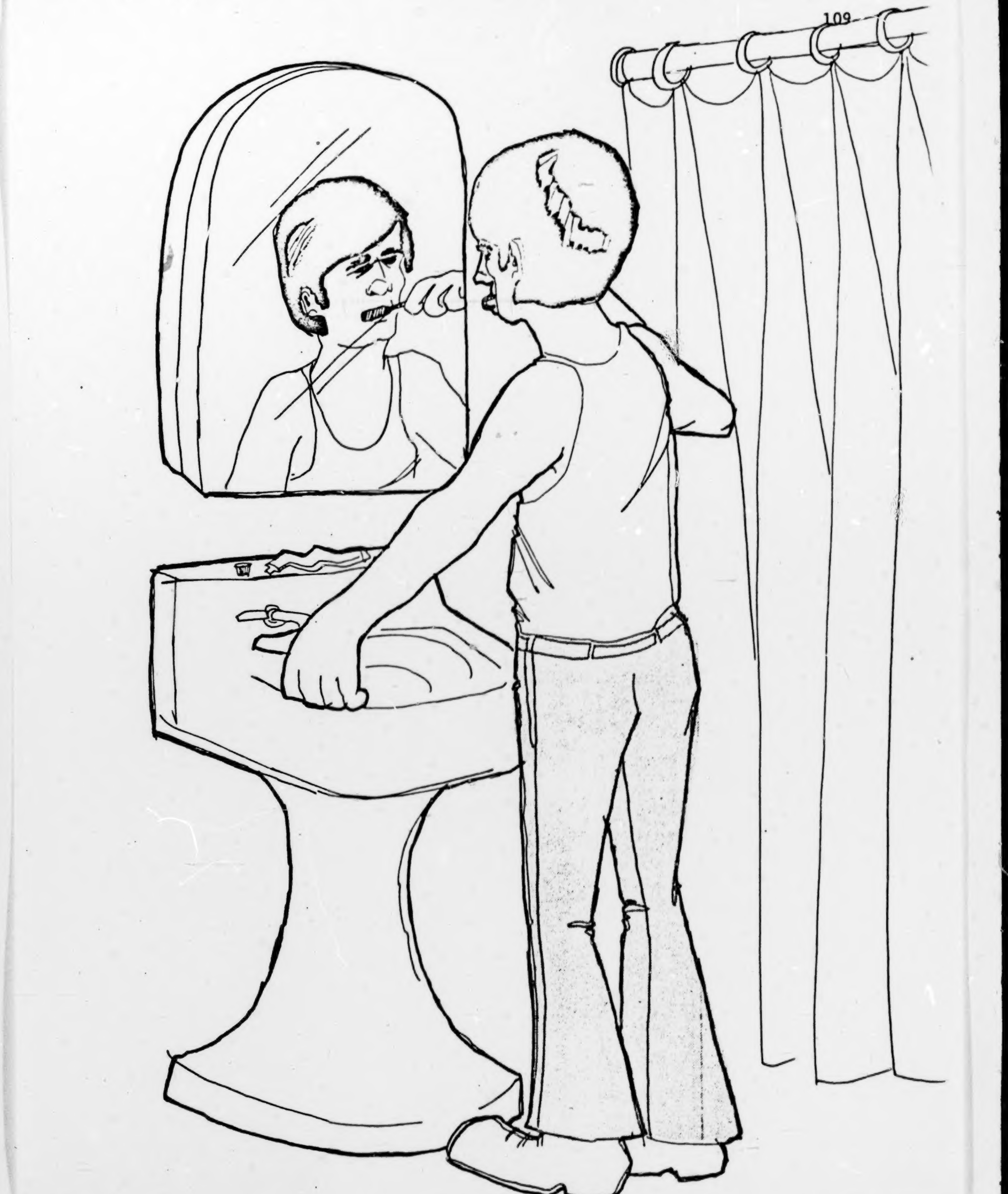
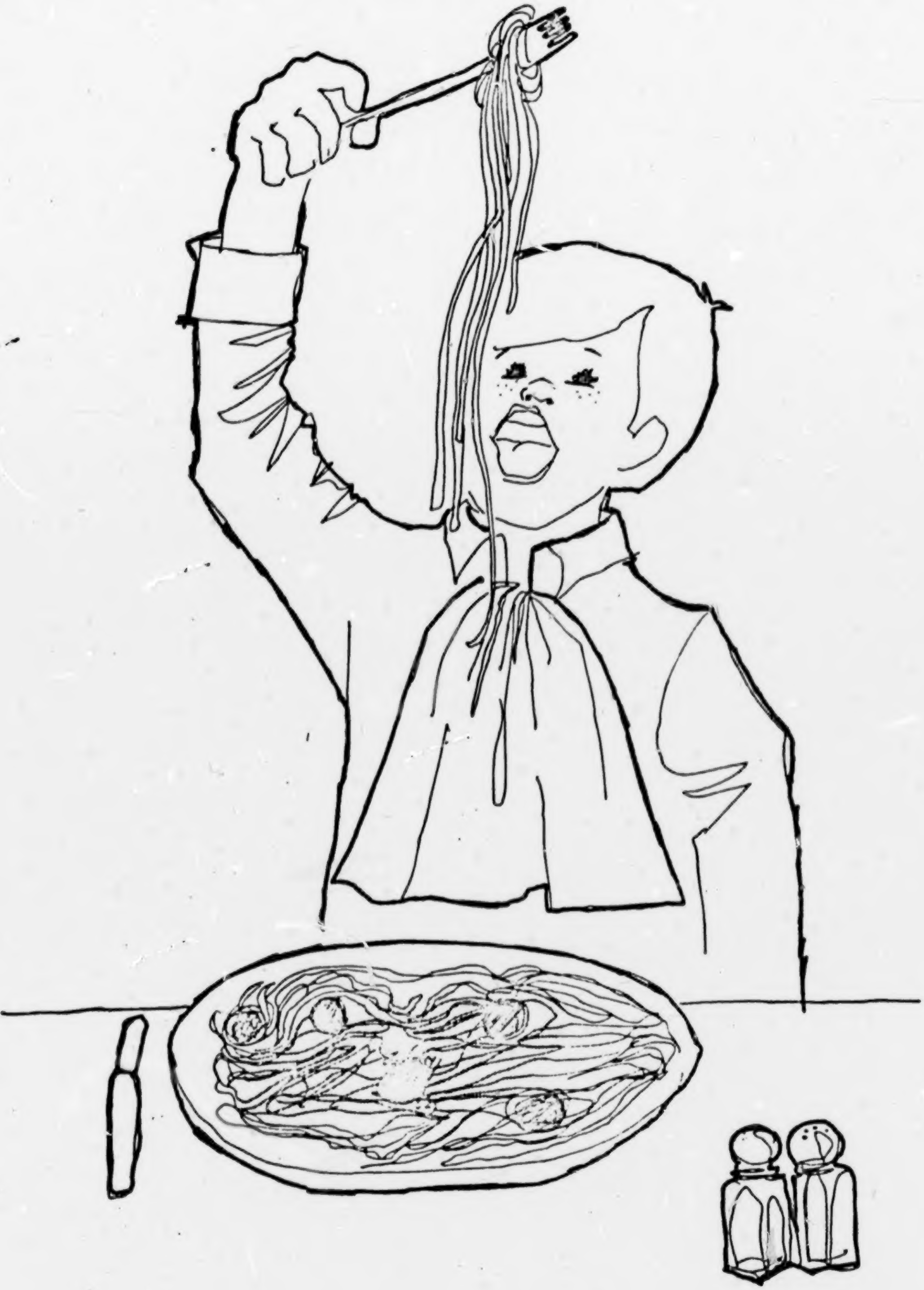
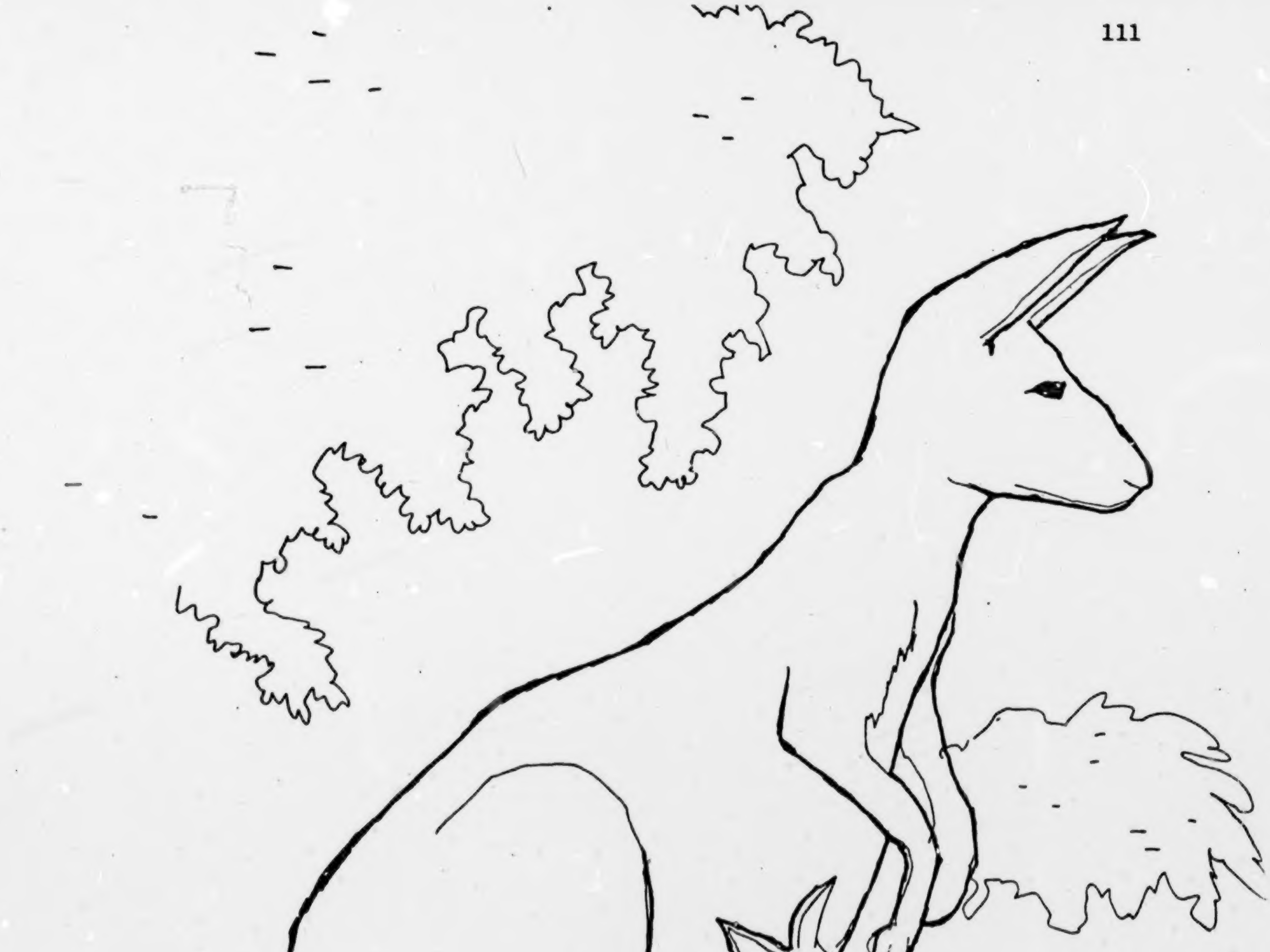
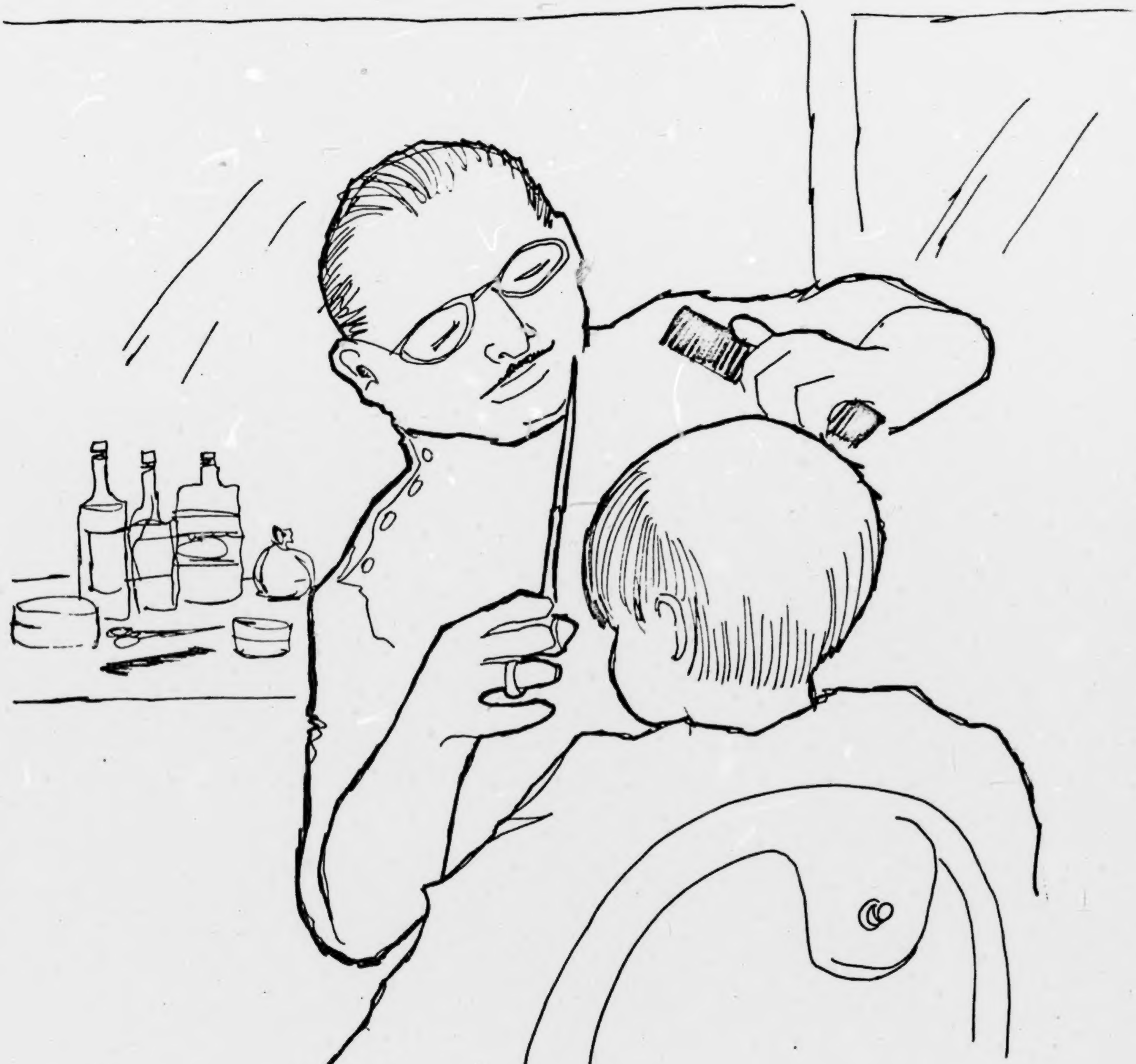
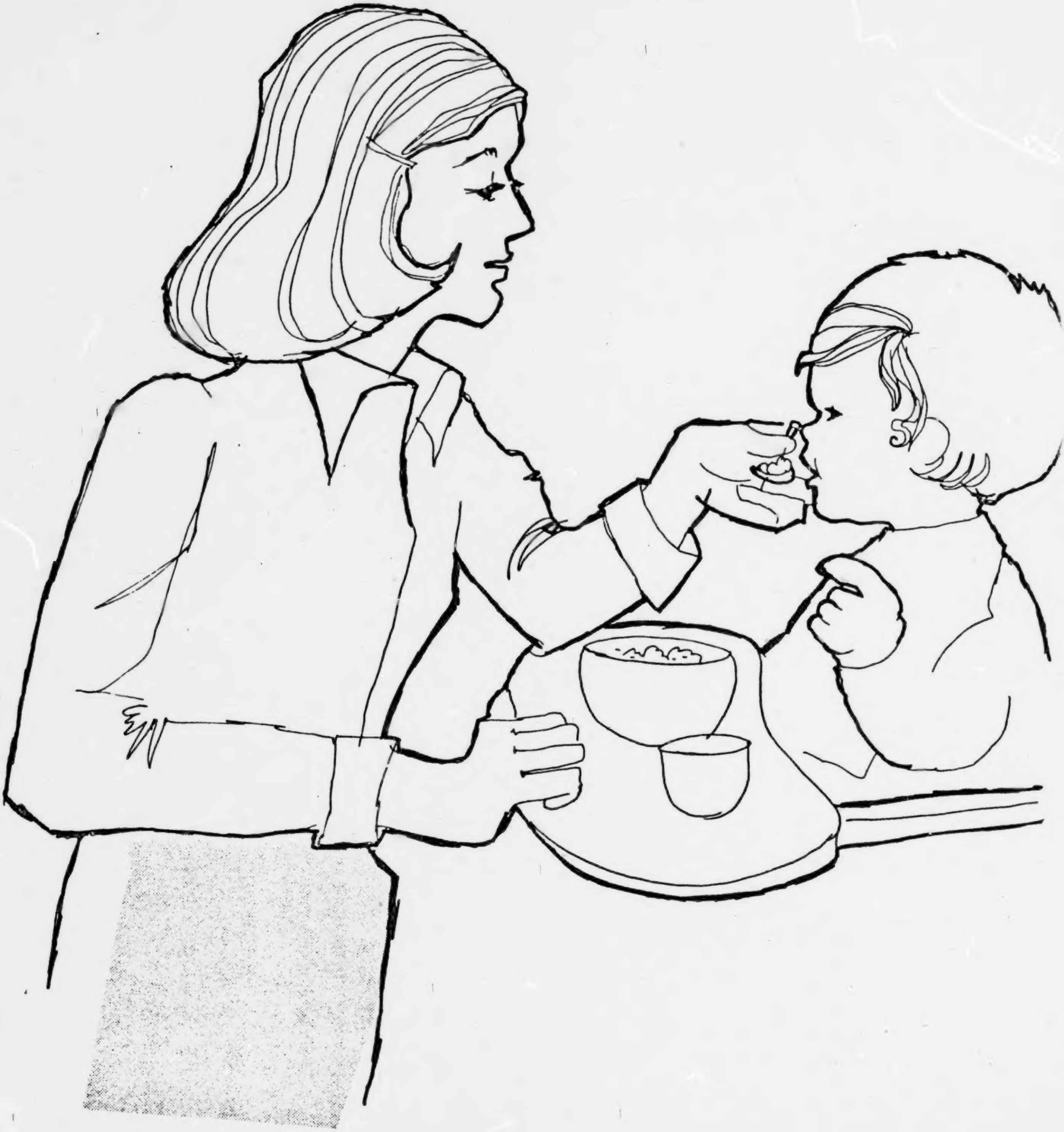
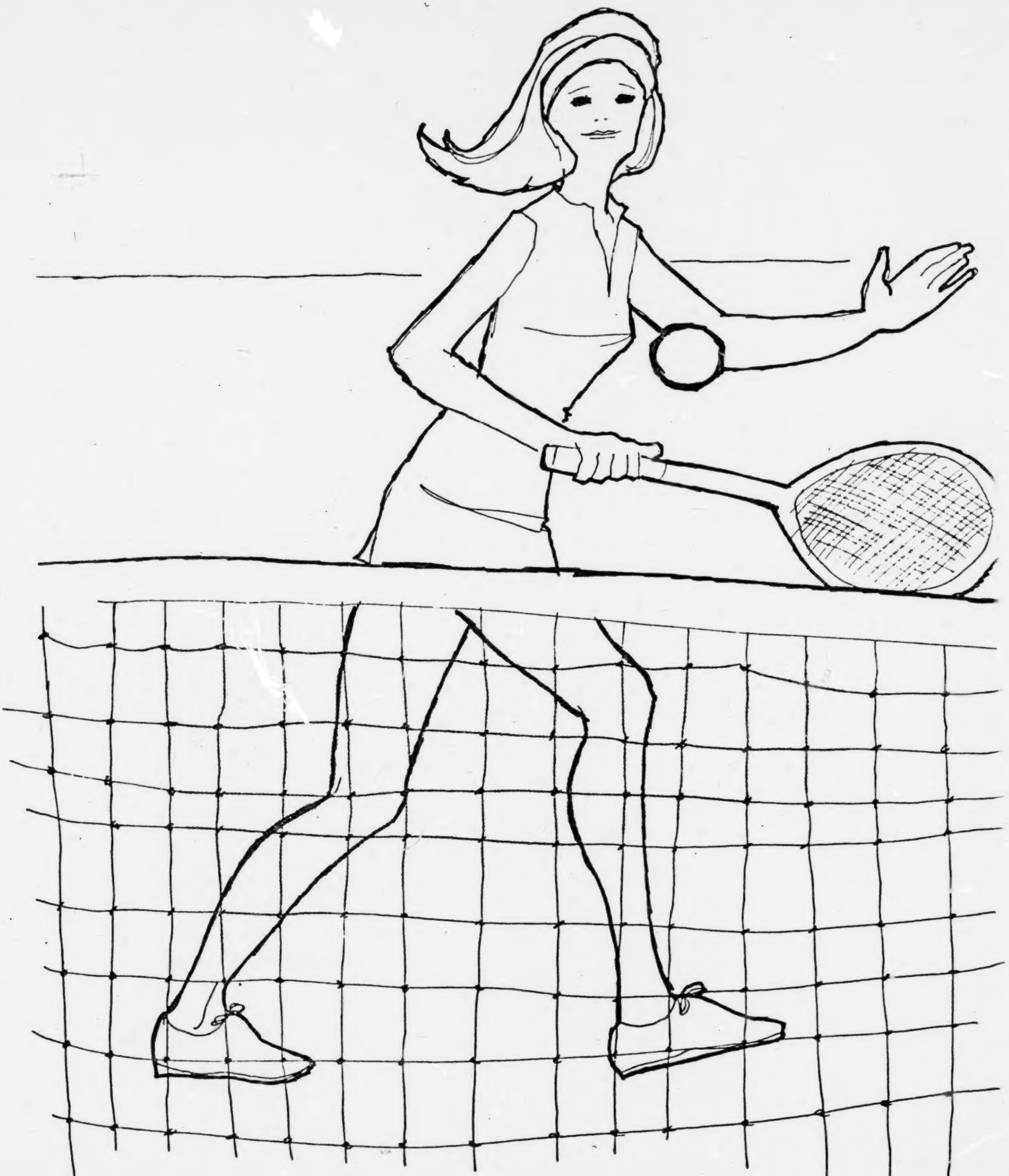


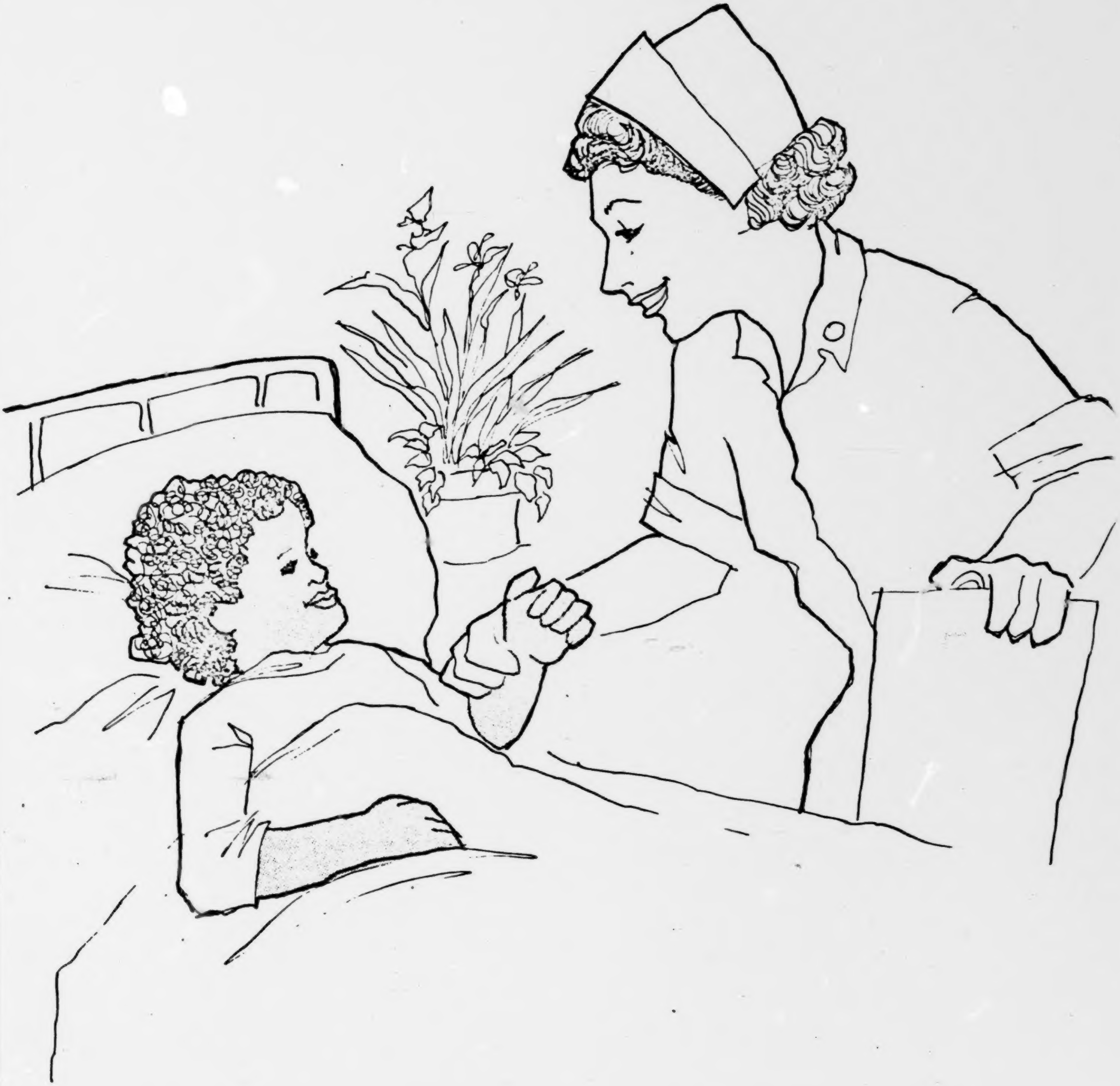


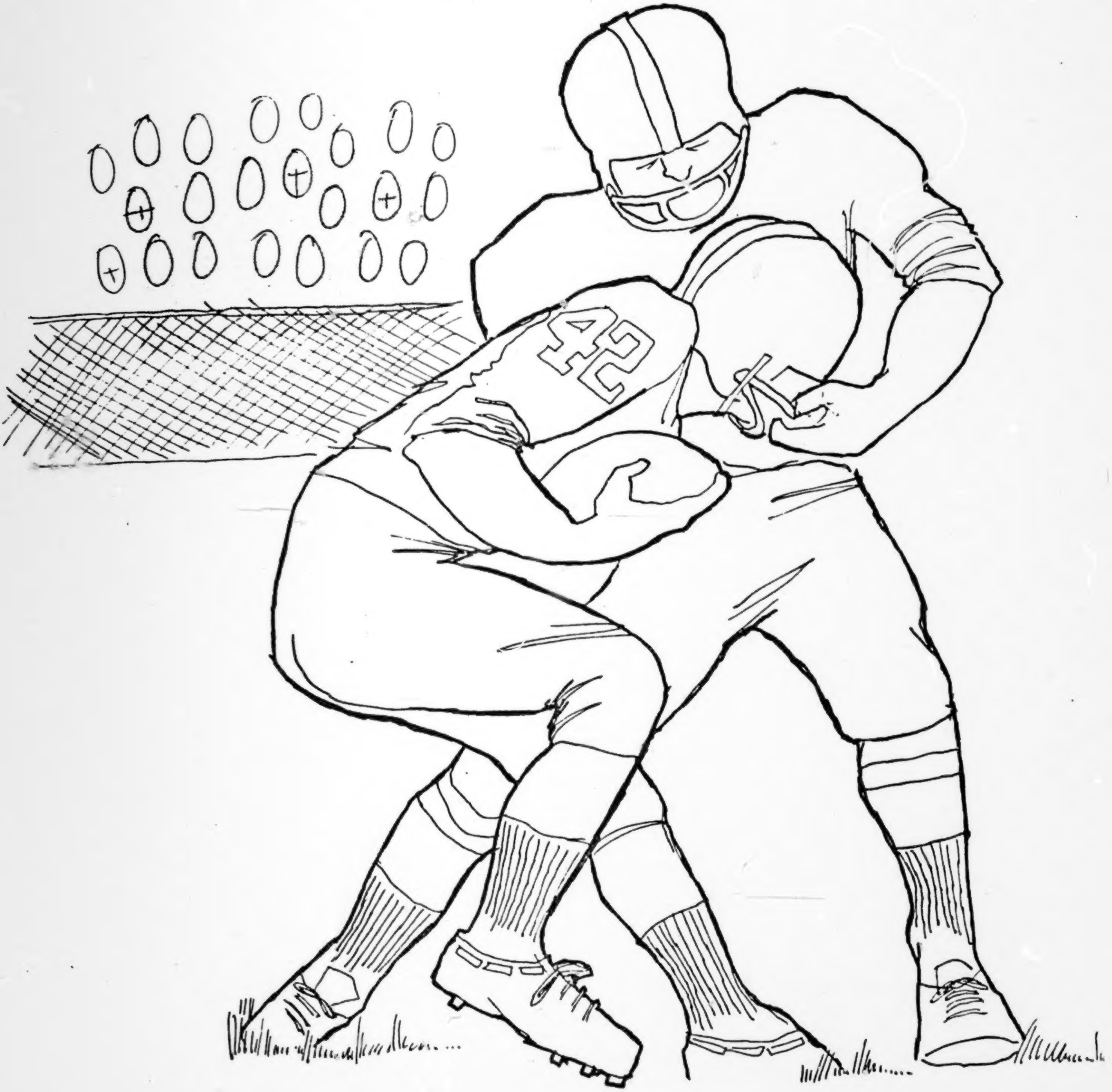


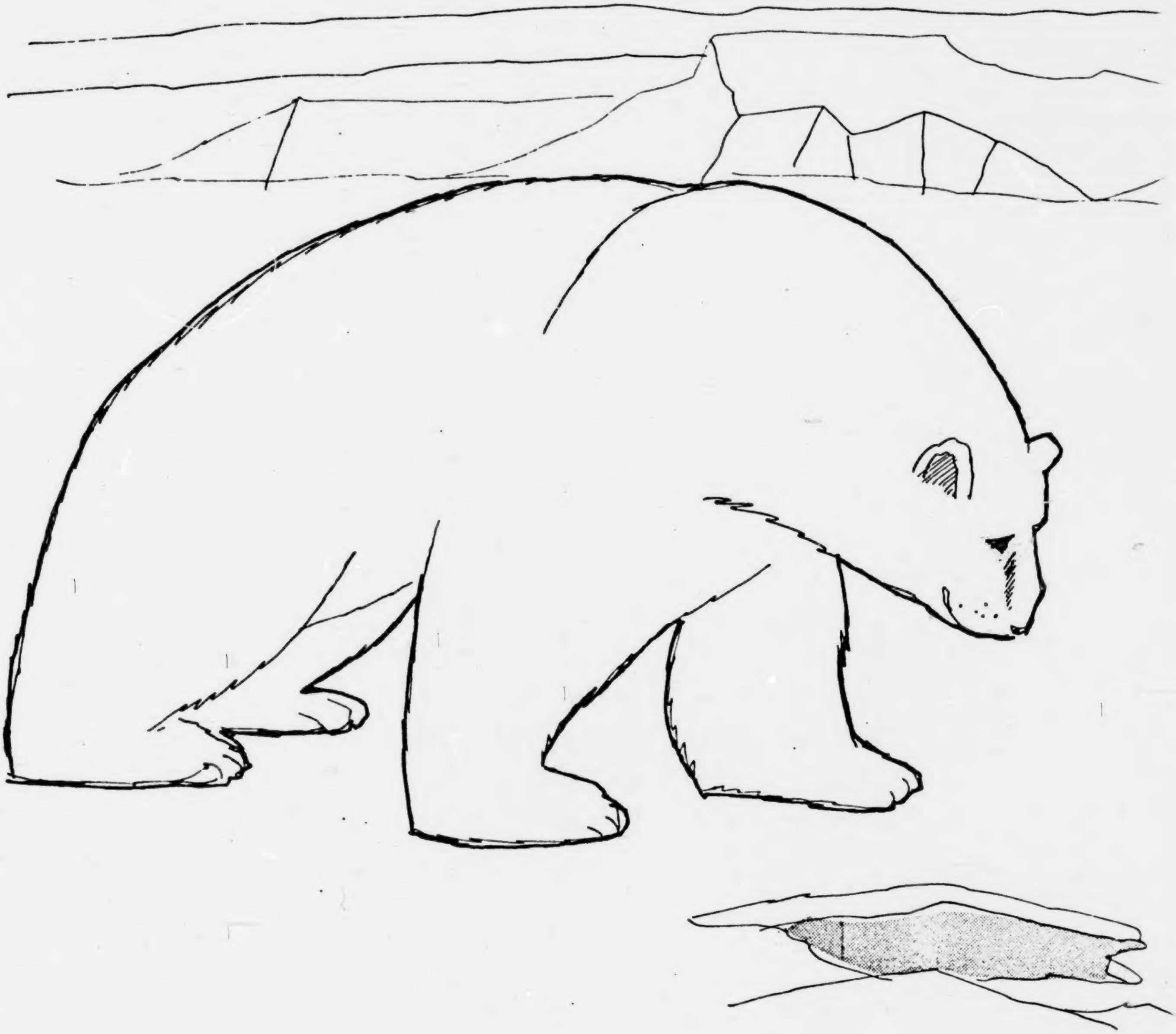


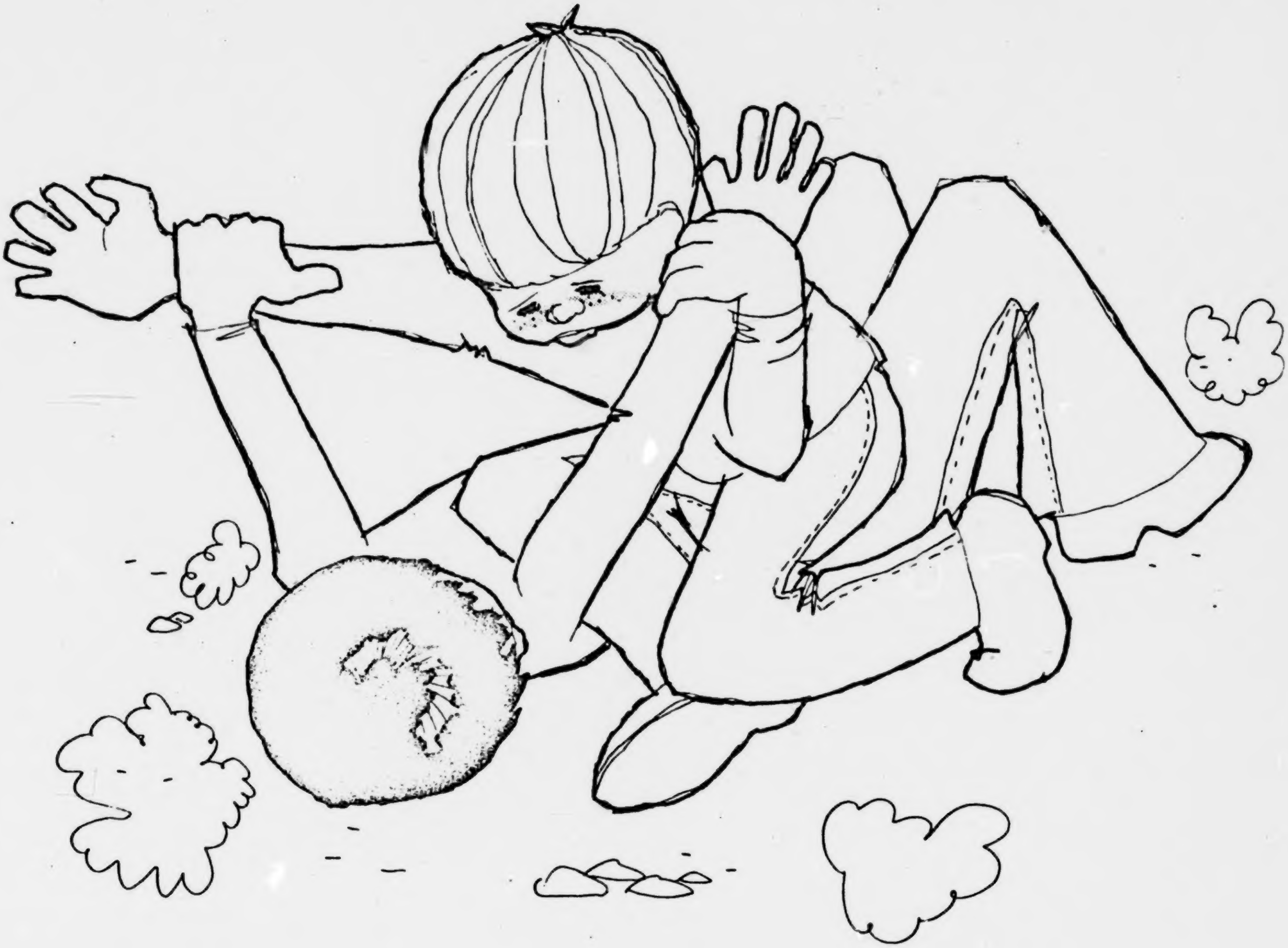




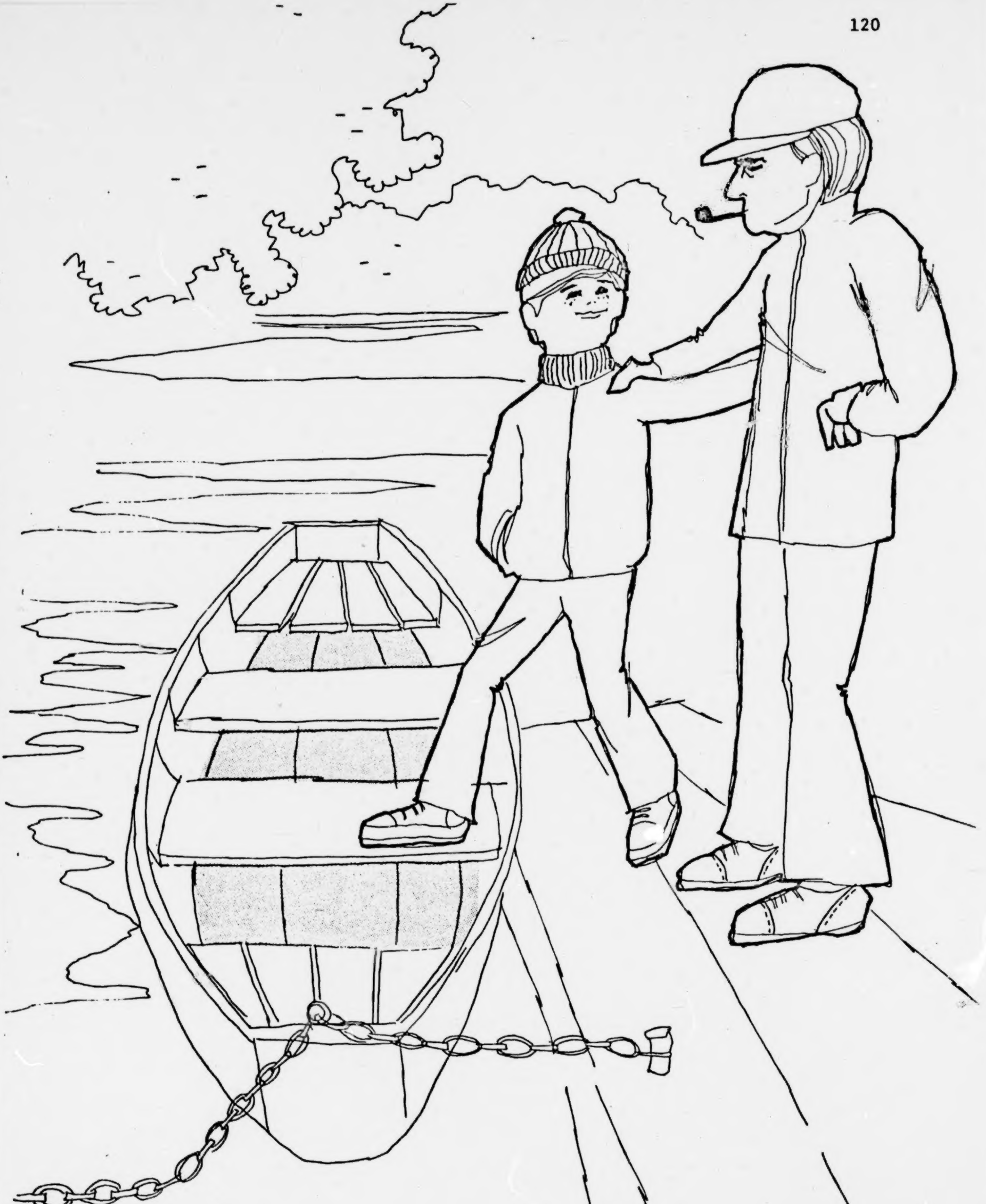


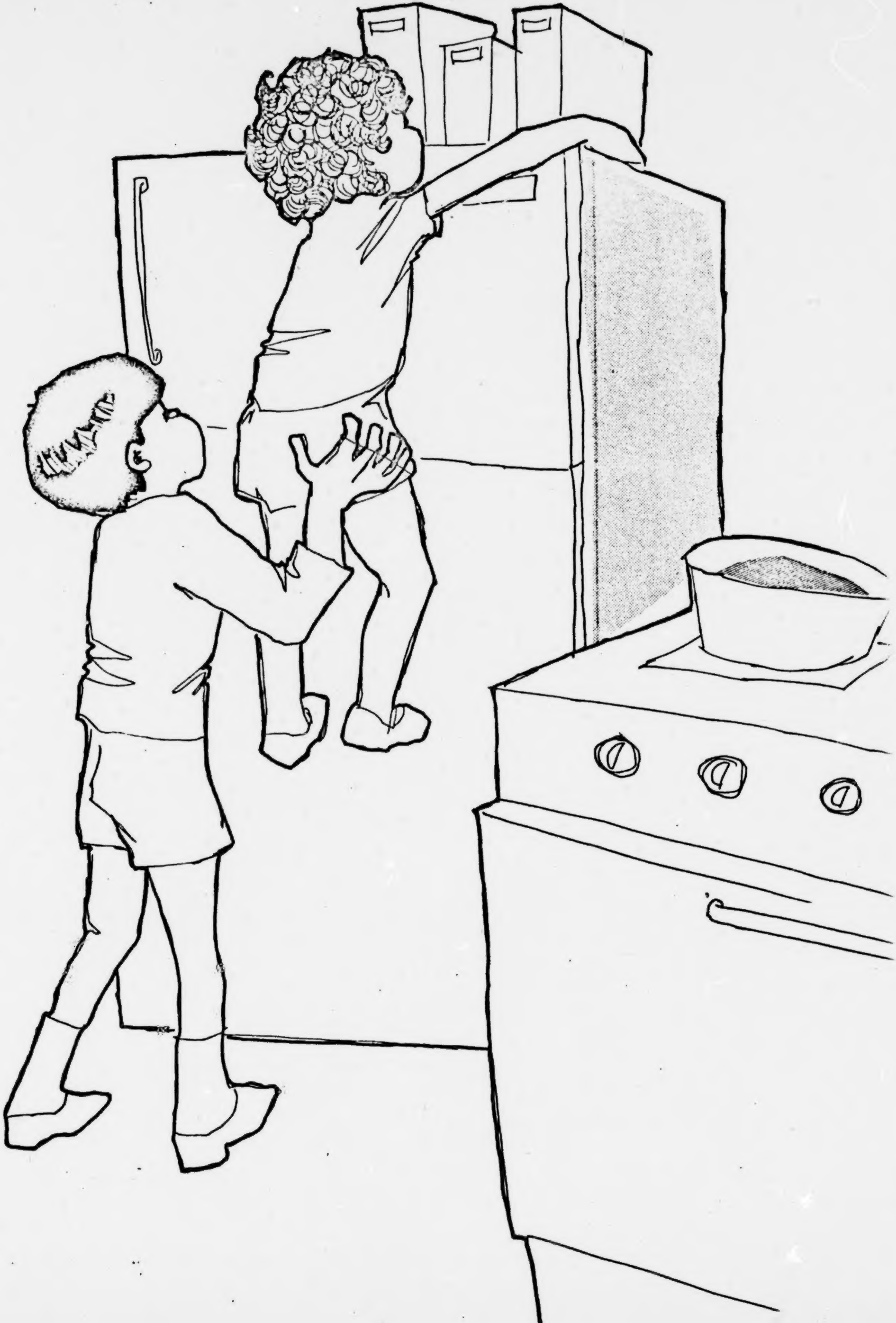

42

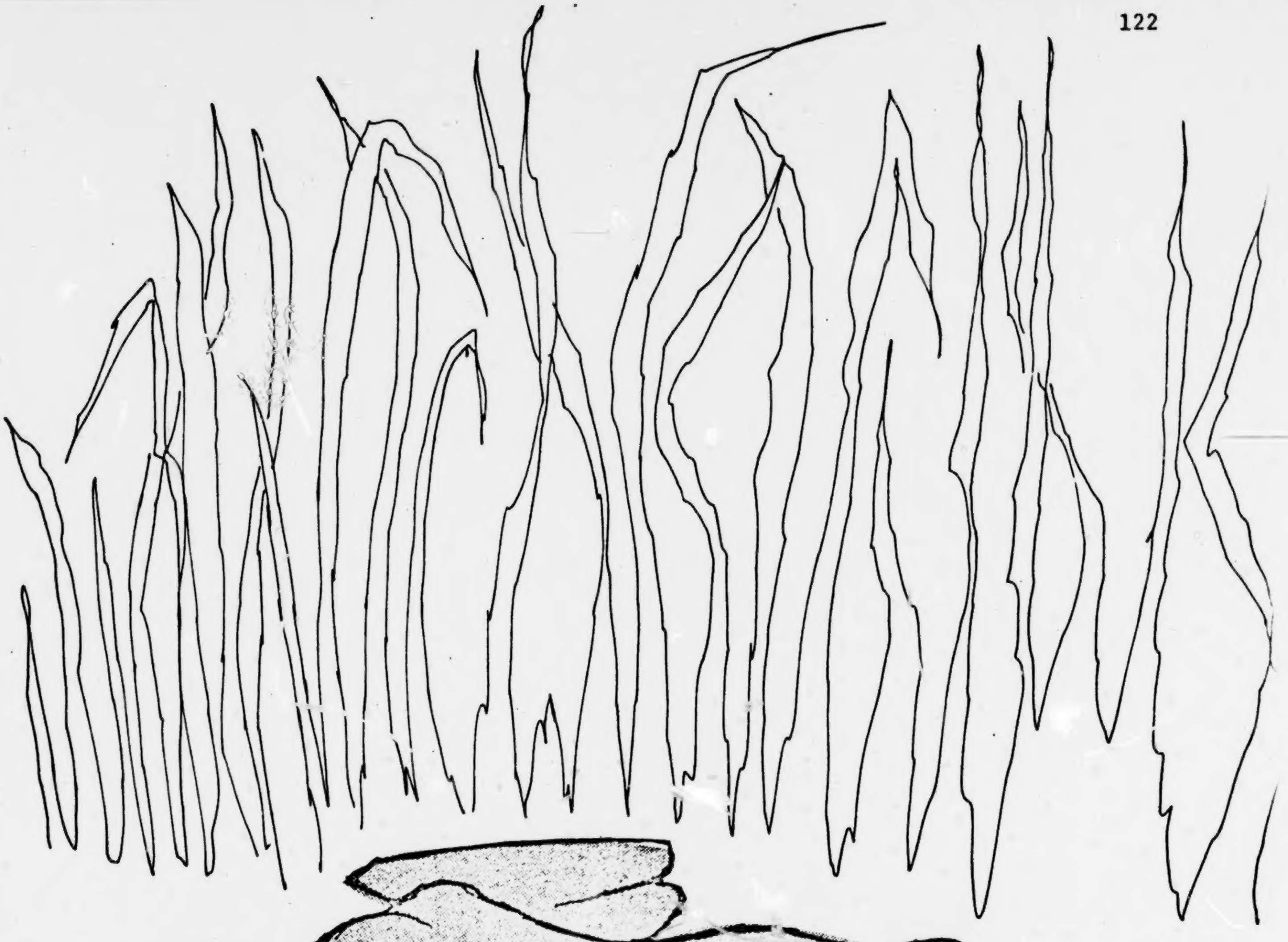


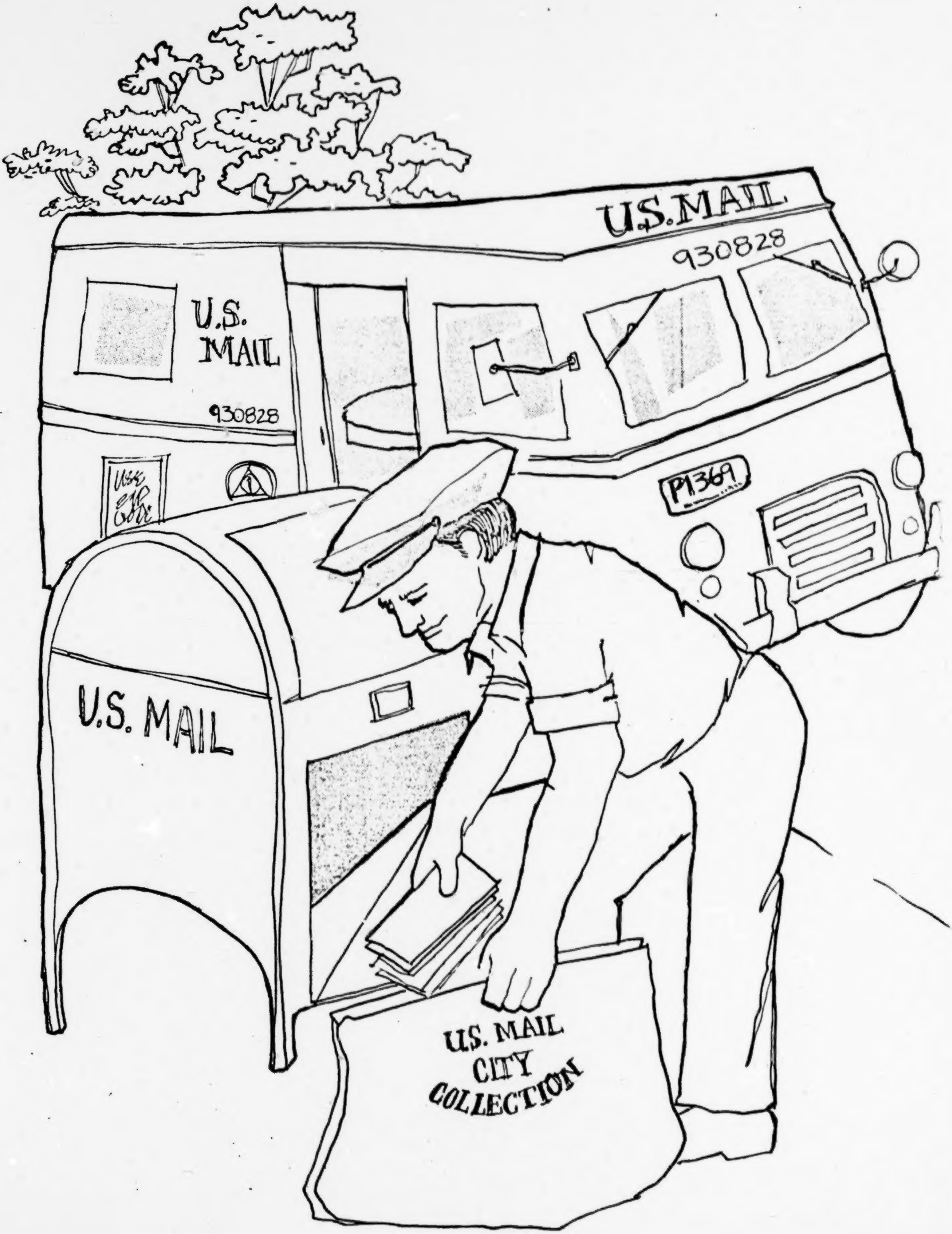


GENERALIZATION PHASE STIMULUS PICTURES





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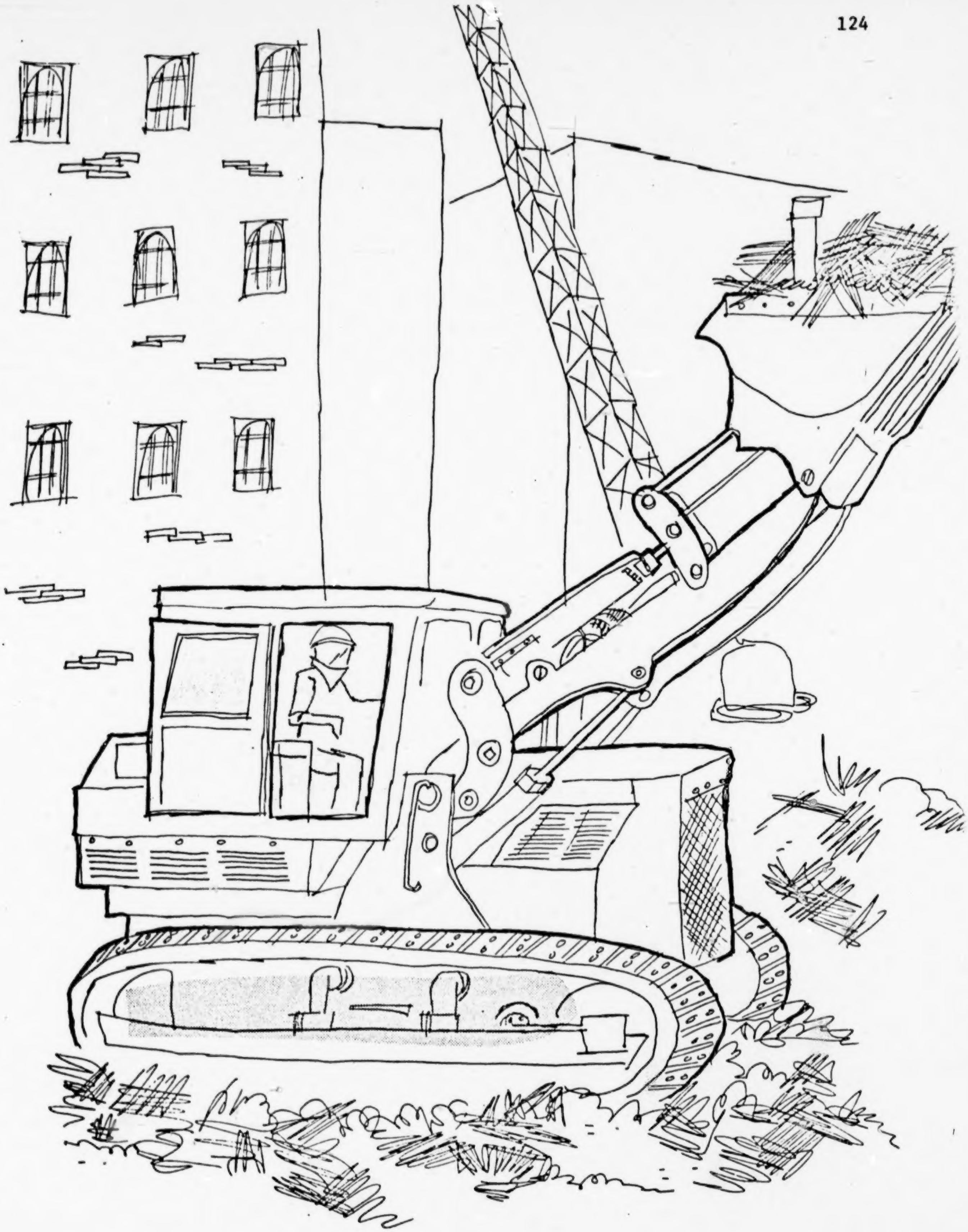

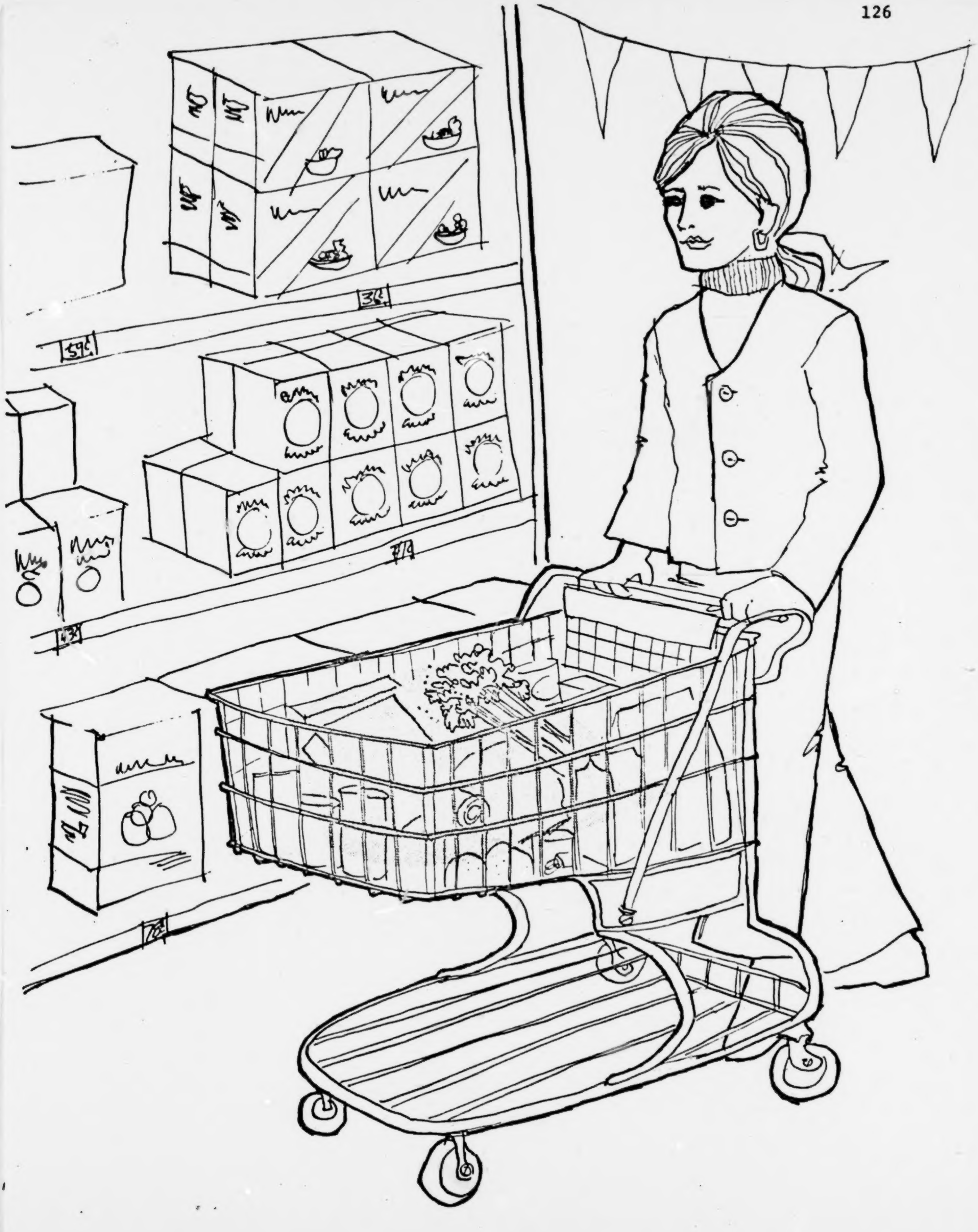
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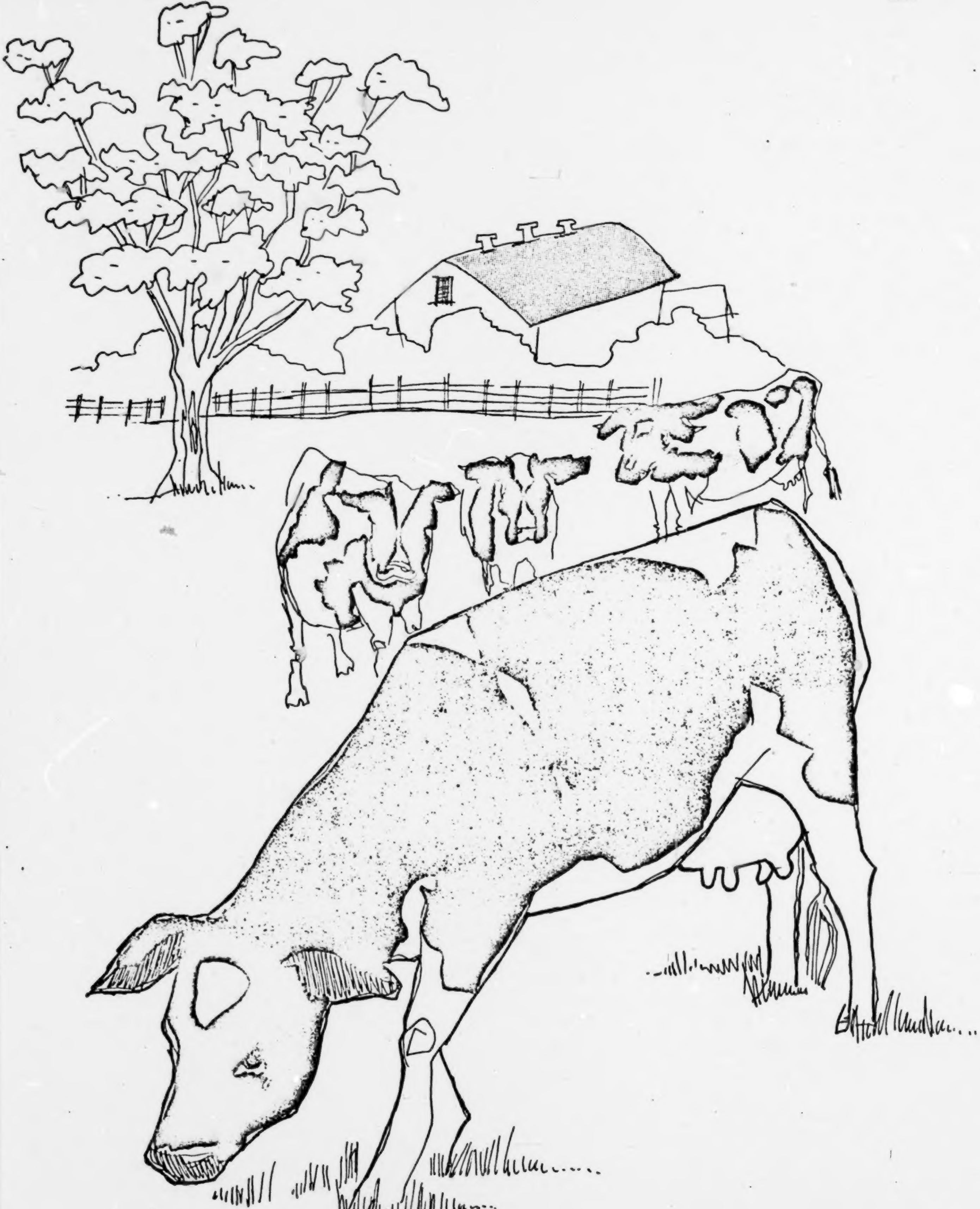

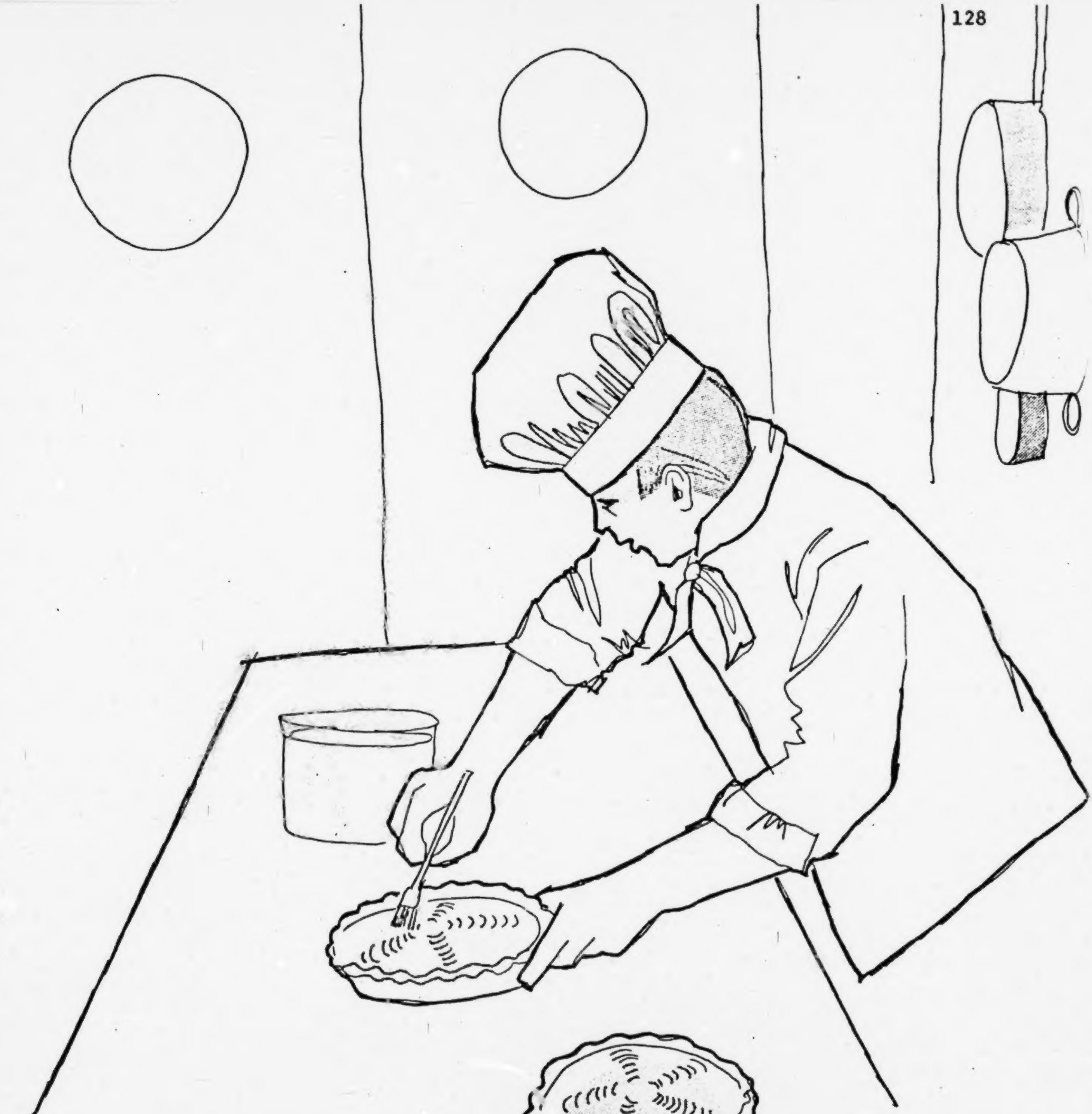

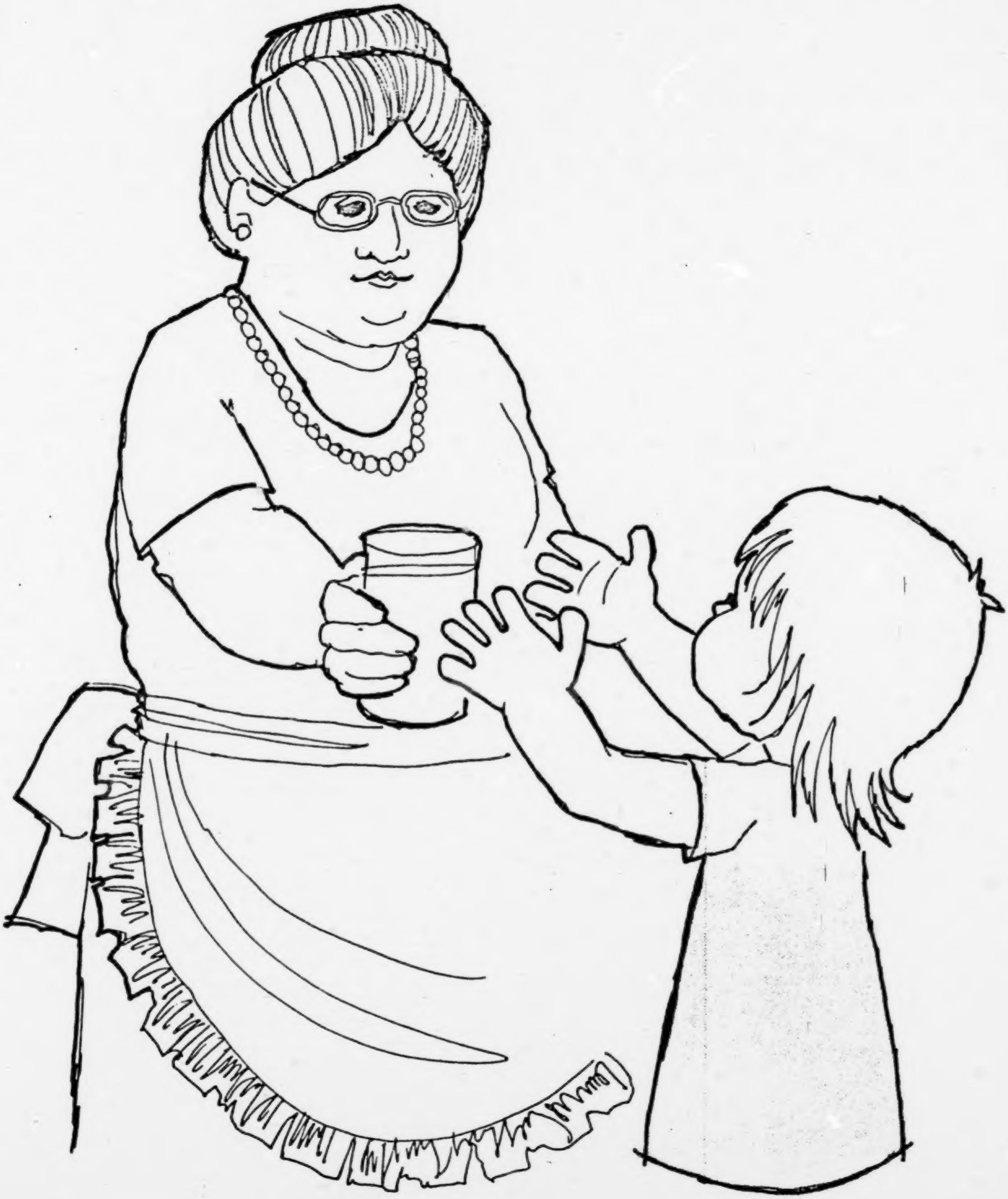

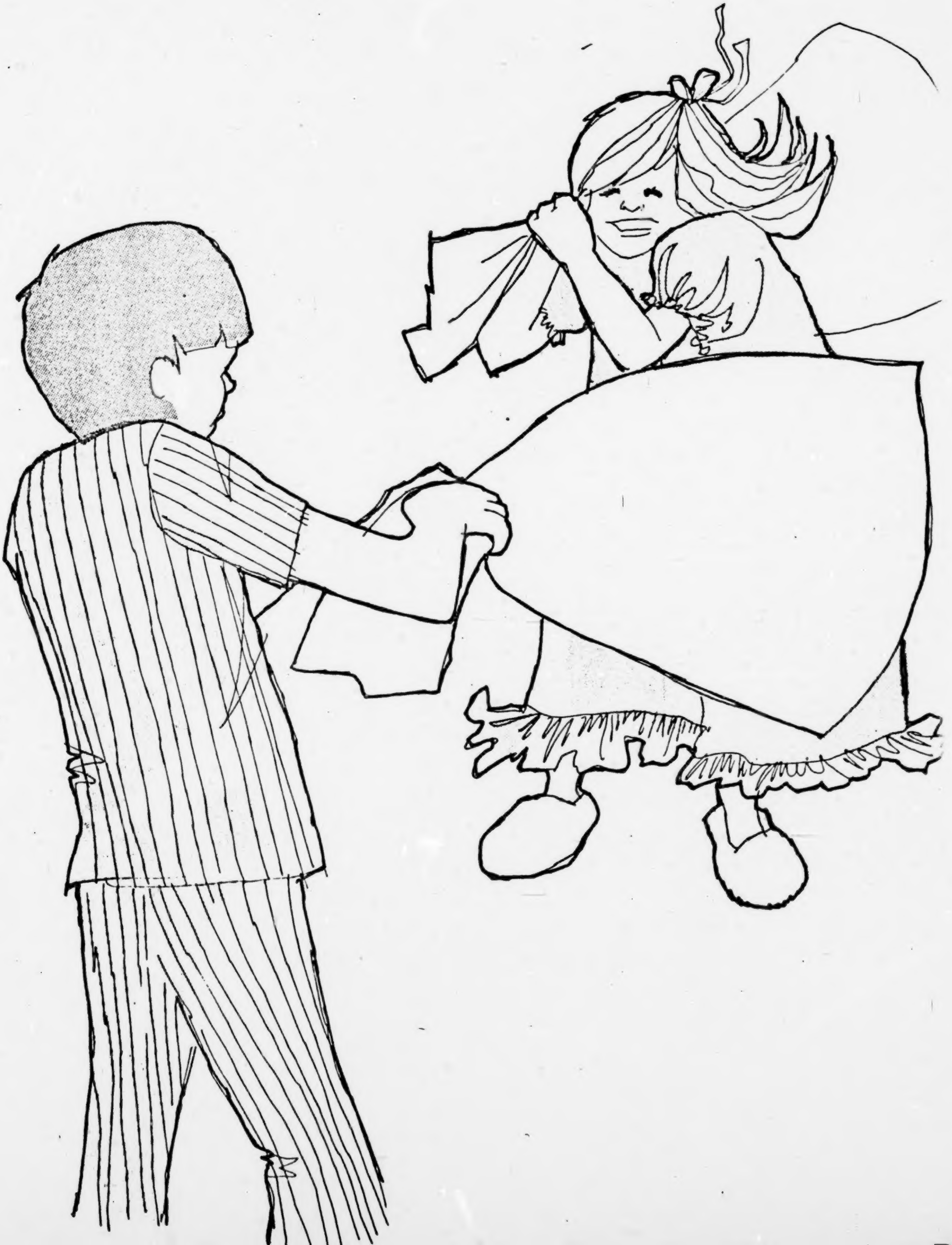

APPENDIX C

MODELED SENTENCES

1. The boy who is lying on the floor chooses to read comics rather than school books.

2. Boys who live in the country prefer hiking to going to the movies.

3. The man who is brushing his teeth doesn't wish to visit the dentist in his office.

4. The boy thinks the spaghetti on the plate is the best that he has ever tasted.

5. The kangaroo which carries the baby in the pouch doesn't want to let the little kangaroo walk.

6. Tom believes the best barber in town is the one who cuts hair without a razor.

7. The baby being fed by his mother likes to spill the food which she gives him.

8. The girl playing tennis would rather play on a court which is made of grass.

9. The girl who is sick in the hospital feels that the nurse is really friendly.

10. The player who has the football considers himself to be the best player on the team.

11. The polar bear that is standing by the hole doesn't enjoy going hungry.

12. The two boys who are wrestling think it's fun to fight with each other.

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CURRICULUM VITAE

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